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# ILLINOIS AGRICULTURAL ECONOMICS

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In the period since World War II, colleges of agriculture have become increasingly involved in international activities — training students from foreign countries, supplying staff members to serve in a wide variety of foreign assignments, contracting with foreign governments to aid in development of educational institutions, and handling a sharply increasing number of foreign visitors.

Many of these activities are directed toward speeding the agricultural development of low-income countries in which agriculture characteristically plays an important role in total economic development.

We know that in order to modernize the economies of these countries, agriculture must supply the food for the expanding urban population, frequently help earn foreign exchange, and provide the capital for promoting economic growth. However, much remains to be learned concerning the specific nature of this process in particular countries at various stages of development. Increased knowledge and understanding in this area is one of the urgent needs of our times. It is a critical element in effective training programs for the increasing number of agricultural economics graduate students, both foreign and domestic, who intend to have professional careers related to the agricultural development of foreign countries. A research base can offer a substantial contribution to the better understanding of agricultural development.

To help give direction to a research program dealing with some of the many aspects of agriculture's role in the overall development process, a conference was held April 13-15, 1964, at the University of Illinois College of Agriculture. The purpose of the conference was to explore areas in which research by agricultural economists promises to be most effective and to suggest hypotheses that might serve to guide research. Substantive results of previous research were discussed only to the extent necessary to provide a problem setting.

This special issue of *Illinois Agricultural Economics* includes the papers given at this conference. They deal with five general problem areas:

1. The agricultural sector in economic development and policy.
2. Characteristics of population and labor force.
3. Farm management research in low-income countries.
4. International trade and economic development.
5. The role of institutional reform.

In addition to the formal papers, the following persons contributed to the conference (discussion of the papers): C. B. Baker, George Brinegar, W. D. Buddemeier, Joseph Casagrande, Folke Doving, Marianne Ferber, C. L. Folse, Marvin Frankel, Robert Gillespie, Fred Gottheil, Joseph Gusfield, H. W. Hannah, Robert Kokernot, Solomon Levine, Robert Mitchell, Russell Moran, Walter Phillips, Demitri Shimkin, Earl R. Swanson, and Edward Tyner.



## The Role of Agriculture in Economic Growth and Development

ARTHUR B. MACKIE

Development and Trade Analysis Division, Economic Research Service, USDA

IT WILL BE MY PURPOSE IN this paper to draw a distinction between the concepts of economic growth and economic development, to define the role of agriculture in economic growth and development, and to examine some of the measures of its contributions to economic growth in three groups of countries at different stages of development.

The limitations of current data and the need for particular types of data are discussed in terms of possible research on the role of agriculture in economic growth and development.

The concepts of economic growth and economic development are often used interchangeably, and the distinction between the two is very vague. However, in this paper I will refer to economic development as the process by which an economy passes from a less developed stage to a more advanced one, whereas by economic growth I will mean a sustained increase in national output or income per capita within a given stage of development. Such a distinction permits one to incorporate the various measures of agriculture's contribution as proposed by Kuznets<sup>1</sup> and Johnston and Mellor<sup>2</sup>

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<sup>1</sup> Simon Kuznets, *Economic Growth and the Contribution of Agriculture: Notes on Measurement*. *Int. Jour. Agrarian Affairs* 3(2): 56-75. April, 1961.

<sup>2</sup> Bruce F. Johnston and John W. Mellor, *The Role of Agriculture in Economic Development*. *Amer. Econ. Rev.* 4(4):566-593. Sept., 1961.

into the stages of growth concept, as proposed by Rostow.<sup>3</sup>

In considering the contributions of agriculture to economic development, it may be useful to first consider the contributions to the growth process, as economic growth involves a shorter period of time. For it is by sustained economic growth over a period of time that an economy achieves economic development, as measured by changes in the structure of the economy.

This distinction appears useful from both the standpoint of analysis and the formulation of policies and programs designed to stimulate growth and achieve development. Specific programs are needed to achieve and maintain growth. Likewise, specific programs and policies or strategies are needed to direct economic growth along certain desired development paths once it has been initiated. The first priority, of course, is to initiate growth. Then policies can be directed toward removal of bottlenecks that impede continued growth.

Finally, a distinction between economic growth and development appears useful from the standpoint of classifying countries that are growing within a given stage of development and those that are in the transitional phase, passing from one stage of development to a higher one.

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<sup>3</sup> W. W. Rostow, *The Stages of Economic Growth*. Cambridge University Press. 1960.

## Role of Agriculture

Agriculture's role in economic growth is a vital one, and its contribution has more than one dimension. Its main contribution, of course, is to supply the basic food and fiber needs of a country's growing population and economy. However, agriculture's total contributions to economic growth go much beyond this fundamental role. With economic growth, the complexity of the contribution increases. In changing from a traditional society to an advanced economy, the role of agriculture in the total economy usually declines.

These contributions are made to the growth process by (1) increasing production, above subsistence levels, of food and fiber at a minimum cost, thereby facilitating growth of the nonfarm economy; (2) stimulating growth of industries, and thus employment in industries processing agricultural products and those furnishing agricultural inputs; (3) providing management and labor resources to other segments of the economy through increased application of technology and innovations in production, thereby increasing production efficiency and releasing labor resources; (4) providing a source of capital for industrial growth and taxes to finance government services during transition; and (5) providing increased income opportunities for a segment of the population, thereby increasing production, specialization, and per capita incomes.

Kuznets has summarized these contributions into more general and perhaps more measurable aspects. According to Kuznets, agriculture makes a direct contribution to growth of national product by increasing the total product. Agriculture also makes a *market contribution* by trading with other sectors. And if it transfers capital and labor resources, it makes a *factor contribution*.

Johnston and Mellor list five contributions that agriculture makes to economic growth as a result of increased production. These are (1) increased food supplies, (2) increased agricultural exports, (3) increased transfer of labor resources, (4) increased capital formation, and (5) increased purchasing power as a result of increased levels of income. These contributions are essentially the same as the Kuznets classification. For example, contributions (1) and (2) above can be included in the *product contribution*, contributions (3) and (4) can be included in the *factor contribution*, and contribution (5) can be included in the *market contribution*. I prefer the Kuznets classification because it is more inclusive and perhaps more measurable in the aggregate.

A more complex, but vital contribution of agriculture to economic growth is made indirectly by agriculture to the total economy. The indirect contribution is less measurable but may influence the magnitude of the more direct and measurable aspects of agriculture's contributions. However, no attempt will be made to deal with these contributions in this paper except to emphasize their relative importance in the total combinations of factors affecting the growth process.

According to Kuznets, there are three interrelated aspects of economic growth: an increase in total and per capita product, an increase in domestic and international flow of goods and services, and rapid shifts in the structure of an economy with prolonged and sustained economic growth.

These three aspects are clearly interrelated. Kuznets stated: "The rise in per capita product, essential to the aggregate view of economic growth, in and of itself means a shift in consumption and savings patterns and thus contributes to the shift in the industrial and other structures of



the economy. . . . Given this interrelation, it is often impossible to specify the contribution of a single sector, say agriculture, to each aspect of economic growth. . . . For if a sector contributes to structural shifts and greater international division of labor, if a sector contributes directly to foreign trade, it indirectly contributes to growth of product per capita and to structural shifts within a country." Hence, the view of the changing domestic structure of a nation's economy in its process of growth can be supplemented by a view of the sequential pattern of the economic flows between it and the rest of the world.

In contrast to agriculture's "relatively simple" contributions to economic growth, its contributions to economic development are more complex, as they involve an accumulation of all the growth contributions over time.

These contributions to development can be more accurately referred to as aspects of development, since they involve changes in the social and economic structure of the economy. These aspects are also more descriptive than operational, since they tend to describe what happens after growth has occurred. For example, changes in income and demand lead to changes in consumption, production, and use of the nation's resources. And, since economic growth involves increases in production, employment, trade, incomes, etc., agriculture's contributions to economic development must be measured in terms of its ability to facilitate structural changes in the total economy.

Transitional growth through the various stages of development is not necessarily smooth or automatic. Therefore, a definition of the total role of agriculture in the economic development of a country must necessarily consider the change in nature of the social, political, and economic environment and its contributions

in relation to the economic opportunities created by the growth process. But this is a complex consideration at best when one attempts to measure these contributions. Consequently, agriculture's contributions to development can probably be better approached through the relatively more simple attributes or contributions to economic growth.

### **Classification of Countries by Growth and Development Characteristics**

The world may be divided, although by no means neatly, into three general groupings — developed, developing, and underdeveloped countries. These groupings can be further subdivided into rapid-, moderate-, and slow-growth countries.

The placement of a given country into a particular category will depend, of course, upon what classification criteria are chosen. For example, growth rates in population and income alone do not offer clear-cut classifications because of high growth rates in both the developed and developing countries. Likewise, growth rates of agricultural production or level of income per capita alone are unsatisfactory. The proportion of the labor force in agriculture and the share of total national product originating in the agricultural sector provide better, but still incomplete, classification. These two development characteristics do, however, provide a useful first approximation to the relative stages of development. And if these two criteria are combined with a general level of per capita income, the general classification of countries can be improved and perhaps form an acceptable basis for some analysis.

A second method of classifying countries was tried. Generally, I accepted the three general categories of countries based upon developmental characteristics and endeavored to compare growth rates

of population, income, and agricultural products.

I chose these comparisons because of the effect of each upon the total growth of a country. For example, a high population growth rate — one that exceeded both income and agricultural production in a country — would necessarily make economic progress very difficult. Such a country would fall further behind if these conditions persisted over a long period of time. On the other hand, if income and agricultural production exceeded population growth, then the conditions for economic growth would exist, and if these conditions prevailed for several years, income, consumption, trade, employment, and production would all increase, thereby causing structural changes to emerge. And with changes in the structure would come higher levels of development, as measured by the share of the labor force in agriculture and the share of the GNP originating in agriculture, among other things.

The results of classifying countries according to growth rates in population, income, and agricultural production are summarized in Table 1, and Figure 1.

### Contributions of Agriculture

A general view of the role of agriculture in economic growth and its contributions to the growth process can be seen

in the general grouping of 78 countries as shown in Table 2. These data are summarized from a recent United Nations publication, *The Growth of World Industry, 1938-1961*.

Data for total income and agricultural production are estimates of gross domestic product at factor cost in constant prices and domestic currencies. Data for some countries were estimated from data on GNP, converted to U.S. dollars, and expressed in 1954 prices. In addition to the noncomparability of data, there may be some distortion of growth rates by this procedure. However, there doesn't appear to be a sufficient basis for concluding that the relative magnitudes or relationships between income, population, and agricultural production are drastically changed by this procedure. Therefore, I have included them in the present analysis.

The data in Table 2 on income, population, and agricultural products show that (1) the growth rates of income, population, agricultural product, and per capita income are highest in the rapid-growth countries, whether they are developing or developed; (2) capital formation, total and agricultural, are also highest in these rapid-growth countries; (3) capital formation in agriculture is negative in the underdeveloped countries; and (4) capital formation is closely as-

Table 1. — Comparison of Population Growth Rates With Growth in Total and Agricultural Gross Domestic Product, Selected Countries, 1950-60

Type of country	Number of countries							
	Population vs. agricultural growth				Population vs. total income growth			
	Agr. GDP data		Per capita agr. GDP data		Total GDP data		Per capita GDP data	
	P>A	P<A	P>A	P<A	P>I	P<I	P>I	P<I
Developed.....	5	11	5	11	0	18	3	14
Developing.....	18	31	7	23	0	50	0	32
Underdeveloped.....	10	0	29	0	10	0	29	0
Total.....	33	42	41	34	10	68	32	46



sociated with growth in total and agricultural product.

It appears from these data that agriculture makes its greatest contribution when a country is growing rapidly. Whether rapid growth in total income is the result of rapid growth in agriculture is not entirely clear. But the high proportion of total income derived from agriculture and the high proportion of total labor force employed in agriculture strongly suggest that a large part of the total growth is generated by the agricultural sector.

One measure of the importance of agriculture to total economic growth is its contribution to total national product. The data in Table 2 and Figure 2 on agricultural gross domestic product (GDP) suggest that the rapid growth rate of agricultural product also rapidly increases

the rate of real returns to the factors of production and thus induces the owners of these resources to increase their investment in fixed capital. Increased fixed capital formation in agriculture in turn adds to the productive capacity and to the basis for continued growth in real product per capita over time. This process of rising output, investment, and output leads to sustained growth and contributes to structural changes in the total economy.

The relationship between the various growth characteristics and development is illustrated by the relative magnitudes of GDP, population, and agricultural GDP in Figure 2. This graph is based on the data in Table 2 and is intended only to portray the gross magnitude of growth characteristics of countries at different stages of development. The points

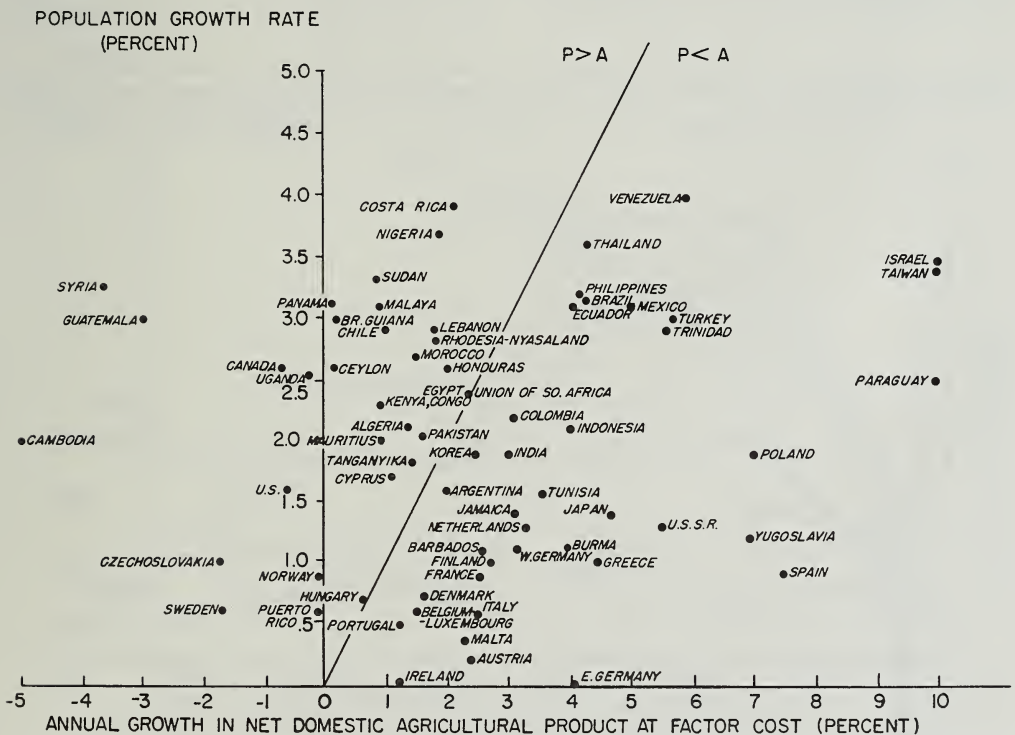


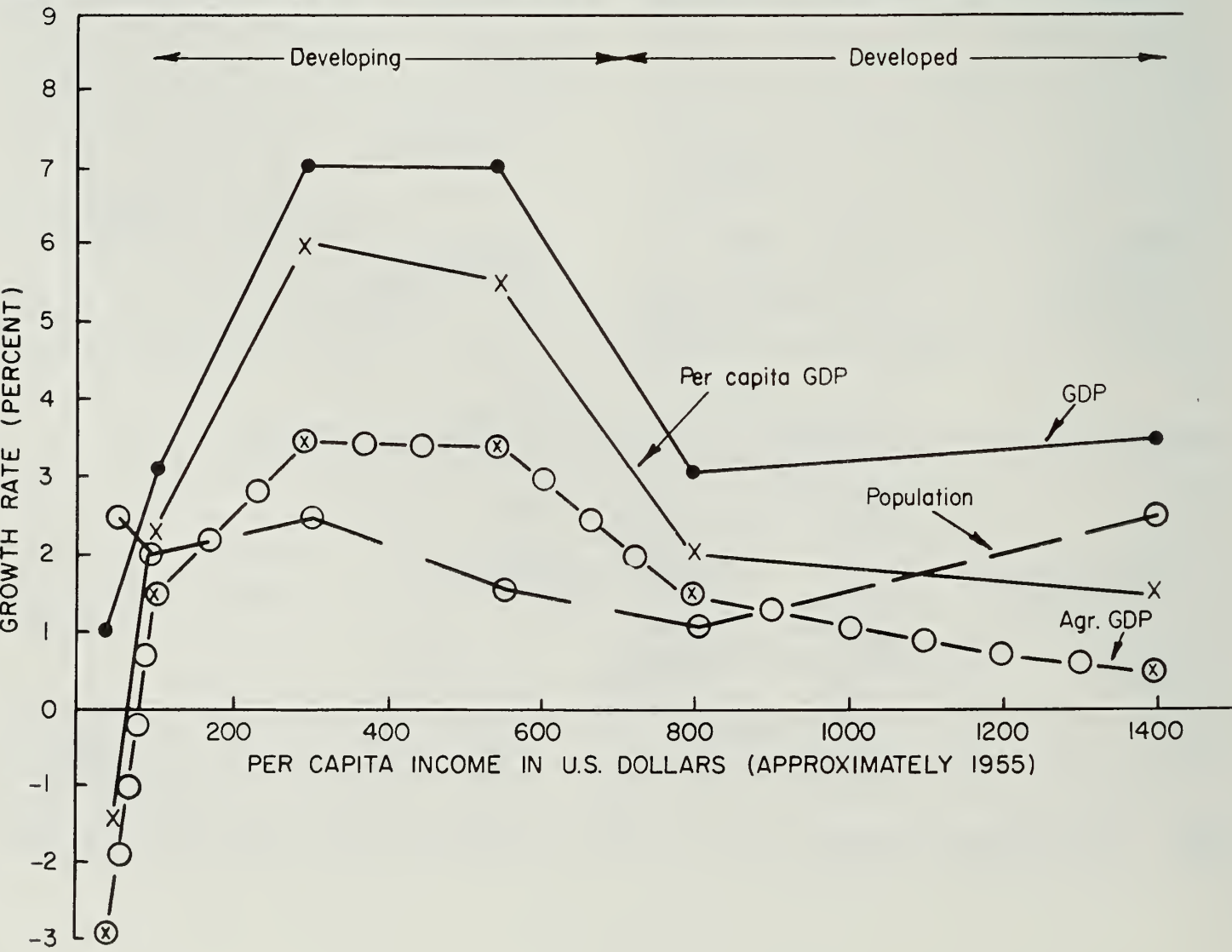
Fig. 1.—Comparison of annual rates of growth in population (P) and agricultural production (A) (70 countries, 1950-60).

Table 2. — Growth and Other Characteristics of Selected Countries, 1950-60 (Ranges of Percents)

Types of countries	Annual growth rate — percent compounded						Ratio of agr. labor to total labor 1950-60	Ratio of agr. GDP to total GDP 1950-60
	GDP	Pop.	GDP per capita	Agr. GDP	Fixed capital formation			
					Total	Agr.		
	(factor cost)		(factor cost)				(percent)	
<i>Developed countries</i>								
High income and moderate growth <sup>a</sup> . . . . .	3-4	2-3	1-2	0-1	3-5	0-1	12	5-9
Moderate income and growth <sup>b</sup> . . . . .	2-4	1	1-3	1-2	3-6	2-8	5-26	5-28
Moderate income and high growth <sup>c</sup> . . . . .	4-10	1-2	3-8	2-5	4-9	4-8	15-67	2-28
<i>Developing countries</i>								
Rapid growth <sup>d</sup> . . . . .	4-10	1-4	3-9	1-6	1-11	1-9	25-88	7-51
Moderate growth <sup>e</sup> . . . . .	2-4	1-3	0-3	1-4	0-7	0-4	30-71	8-68
<i>Underdeveloped countries</i>								
Slow or no growth <sup>f</sup> . . . . .	0-2	2-3.5	-(1-2)	-(1-5)	...	...	25-71	16-65

<sup>a</sup> Includes United States and Canada.  
<sup>b</sup> Includes Sweden, Switzerland, United Kingdom, Denmark, Norway, Belgium-Luxembourg, Ireland.  
<sup>c</sup> Includes France, West Germany, Finland, Netherlands, Austria, Czechoslovakia, U.S.S.R., Hungary, Italy, Poland, Yugoslavia.  
<sup>d</sup> Includes Japan, Mexico, Greece, Republic of South Africa, Jamaica, Venezuela, Israel, Puerto Rico, Costa Rica, Spain, Barbados, Portugal, Colombia, Burma, Peru, Brazil, Ghana, Trinidad, Algeria, Bulgaria, Turkey, Iraq, Rhodesia, Nyasaland, Guatamala, Ecuador, Philippines, Egypt, Ceylon, Taiwan, Paraguay, Korea, Thailand, Congo.  
<sup>e</sup> Includes Chile, Malta, Nigeria, Panama, Cyprus, Mauritius, British Guiana, Honduras, Tunisia, Kenya, Sudan, Pakistan, India, Indonesia, Burma, Tanganyika.  
<sup>f</sup> Includes Malaya, Syria, Cambodia, Uganda, Morocco, Argentina, Lebanon.  
Source of data: The Growth of World Industry, 1938-1961 U.N., New York. 1963.

Fig. 2. — Relation of growth characteristics of countries to their development (1950-60).





indicated are midpoints in the range of growth rates for the countries included in the indicated growth categories.

So far I have been able only to suggest something about the nature and magnitude of the *product contribution* of agriculture, and to indicate that capital formation is highly associated with growth in production. Real capital formation in agriculture does not indicate the contribution of agriculture to the nonfarm sector by capital transfers. Rising returns to the factors of production do, however, indicate the possibility for increased savings, but knowledge of the distribution of increased returns to the factors is necessary to determine the amount of capital transfer.

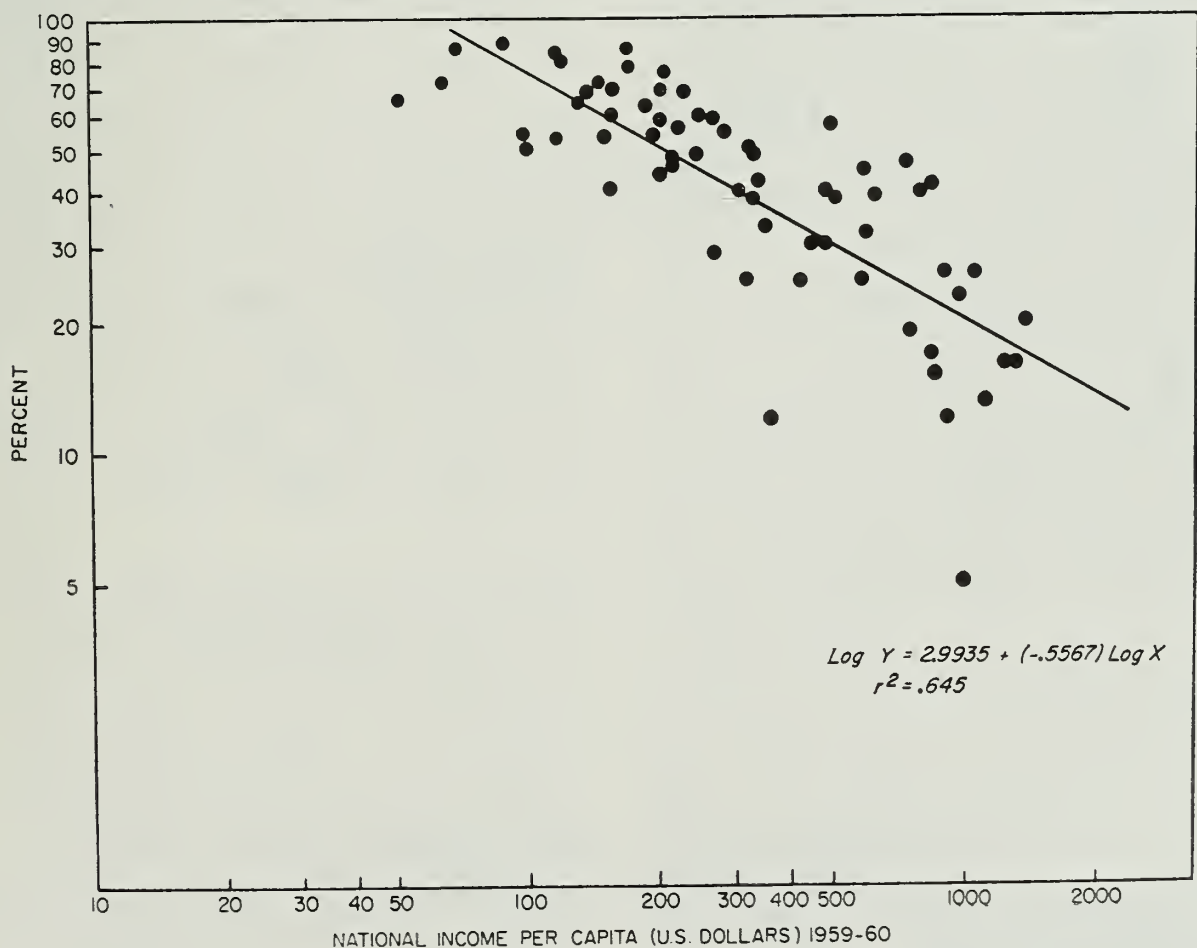
A measure of the extent of transfer of labor resources out of agriculture can be determined by the rate of migration within a given time period. I chose not to present any data of this nature, but

rather to deal with the change in the proportion of the labor force engaged in agriculture in various countries at different levels of development in 1959-60.

A cross-sectional analysis, as shown in Figure 3, is suggestive of the relationship of changes in employment associated with growth in per capita income. The wide scatter of the data and the relatively low correlation ( $r^2 = .6$ ) suggests that the reduction in the proportion of agricultural employment with economic growth is not uniform and differs greatly from country to country. Part of the wide variation among countries is, no doubt, associated with geographic size of the country as well as the nature and extent of its natural resources. Figure 4 shows the relationship between per capita income and agriculture's share of GNP.

The magnitude of structural changes that might occur in a rapidly growing economy can be illustrated from the his-

Fig. 3.— Proportion of labor force engaged in agriculture: declines with economic growth (69 countries around 1959-60).



torical case of American agriculture. In Thomas Jefferson's time, 90 percent of the population was engaged in agriculture, while by 1960 this proportion had shrunk to less than 10 percent. In 1870, almost 40 percent of the nation's GNP was attributable to agriculture; by 1960, agriculture's share of GNP had declined to about 5 percent. In 1865, agricultural products made up about 83 percent of total U.S. exports; this percentage had declined to about 22 percent by 1958. However, during this time real gross farm product per farm worker in the United States increased 5.4 times, or 440 percent; it increased 2.7 times, or 170 percent, from 1936 to 1958.

Thus agriculture's role in economic development is a very important one. In the slow-growing, low-income countries, the lack of a vigorous agricultural sector appears to be a drag on total economic development. In the rapid-growing and developing countries, its contribution be-

comes dominant and perhaps the prime force in total economic growth by providing the necessary forward momentum needed to keep the growth process going.

Through work specialization, division of labor, and improved use of resources, agricultural production is increased, thereby enabling agriculture to (1) support an increase in population, (2) stimulate the growth of an exchange economy, (3) provide a source of capital for industrial development and governmental functions in the transition period, (4) earn the much-needed foreign exchange for capital development, (5) make available the labor supply necessary for the growth and development of infant industries and trade, and (6) provide the major stimulus for growth and development of industrial sectors so essential to the "takeoff."

Rising real incomes in agriculture resulting from increased productivity not only make the above contributions pos-

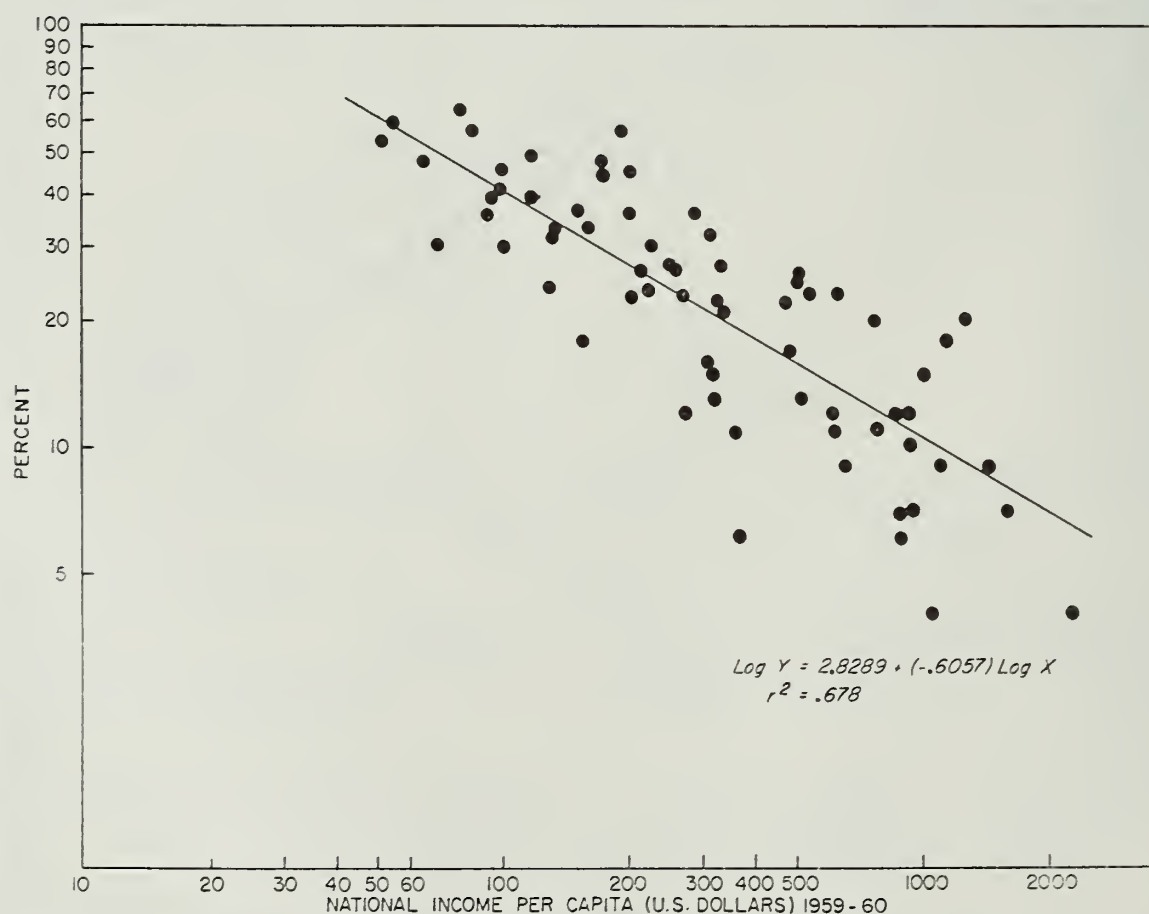


Fig. 4.—Agriculture's share of gross national product: declines with economic growth (68 countries around 1959-60).



sible, they also provide the incentives and conditions for human resource development so essential for continued progress in scientific, political, and social development. In the words of Professor Rostow, "The rate of increase in output in agriculture may set the limits within which the transition to modernization (economic growth) proceeds."

Agriculture further contributes to economic growth during the transitional period by (1) stimulating the growth and development of processing industries using farm products and industries producing farm inputs, thereby increasing employment in the nonfarm economy, (2) supporting price stability through increased and more efficient production, and (3) supporting nonfarm growth through expansion of demand for nonfarm products.

Although economic growth may receive its initial impetus within the agricultural sector, its subsequent contributions depend upon concomitant developments in the nonfarm sector, especially industrial. The interrelated effects of agricultural and industrial development provide the economic opportunities for further development within each sector, which growth of one sector alone cannot provide.

The passing of a nation's economy into a period of rapid economic and industrial growth ushers in a period of profound structural changes in the economy as represented by changes in employment, production, income distribution, and consumption.

The role of agriculture in the economy is also changed from the dominant economic sector to a declining sector in terms of its relative share of the nation's total employment, income, and production. Expansion in total national product and income in a maturing economy depends more and more on nonfarm growth than on agriculture. The role of agricul-

ture becomes increasingly one of adjusting to the changing economic forces created by nonfarm growth and by increased application of technology in the production of a larger output with fewer resources, especially labor.

Successful agricultural adjustments to nonfarm growth may be broadly classified as making a dual contribution to total economic growth. That is, agriculture provides manpower to the growing nonfarm sectors while its shrinking share of the nation's manpower provides an adequate supply of food and fiber for the urban population at rather constant prices. This adjustment also involves increased commercialization of farming and increased interdependency. Agriculture's role in helping to promote and sustain economic growth depends on its ability to develop flexibility and response to both adverse and favorable economic events.

Thus agriculture, in further pursuit of increased levels of farm incomes through expansion of production, becomes increasingly dependent upon growth and structural changes in the total economy. The extent to which productive and constructive outlets for farm products can be developed will largely determine the future role of agriculture in advanced societies. Opportunities for increasing the use of agriculture's productive capacity appear most promising in the area of utilizing farm products to stimulate world economic development. Such uses may stimulate world trade and, eventually, a larger demand for industrial and farm products.

The role of agriculture in continued economic growth of advanced economies may well rest upon its direct and indirect contributions to international trade. In this or any other area of contribution, agriculture will perform its greatest function through improved production with

fewer resources. The application of improved production methods will increase the spread effects of agriculture on the total economy, which in turn will create additional opportunities for agriculture through expansion and growth of the total economy.

### **Limitations of Data and Aggregate Analysis**

It is one thing to list the contributions of agriculture and another to measure or quantify these contributions. At present, data on income and agricultural production are very sketchy for the majority of countries. Data are available for a larger number of developed countries than for underdeveloped countries, of course, but even in these countries there are large gaps in the information on major economic sectors. National income accounts are not always uniform, but this is improving with the help of the United Nations and the International Monetary Fund.

Aggregate data on total national income and trade are rapidly improving. But agricultural production and trade data for most countries are far from being sufficient to enable one to determine

the components of agricultural production by sectors or major crops. It would be very helpful if more information were available for just the commercial sector of agriculture. It is in this sector that growth will occur, and it is this sector that will generate the agricultural surpluses for trade, as well as changes in production, income, consumption, and capital accumulation necessary for major contributions to economic growth.

The data I have presented here today are not adequate for the task at hand, as they have many limitations. They are, however, recent data and perhaps the most indicative of what is going on in the various countries of the world. In spite of their limitations, I think that these data do reveal relevant relationships and suggest adequate hypotheses that need testing.

The USDA is currently doing research on the factors affecting agricultural productivity in the underdeveloped countries under contract with AID. It is our hope that out of this research will come sufficient data to fill the many gaps and provide additional knowledge about the role and contributions of agriculture to economic growth in developing countries.

## **Policies for Agricultural Development**

WADE F. GREGORY

Development and Trade Analysis Division, Economic Research Service, USDA

**I**T IS ENCOURAGING TO THOSE of us working in the field of economic development to know that an institution like the University of Illinois is becoming actively engaged in research related to the problems of underdeveloped areas.

The topic assigned to me, "Policies for Agricultural Development" is a broad one, and I shall restrict my comments to a few areas.

One of the first policy issues to be faced in mapping out development strategy is to make explicit the role expected of the agricultural sector and to insure that the objectives are not only internally consistent but also reinforce rather than compete with the objectives for overall economic and social development of a nation as a whole. You all know the objectives usually listed for the agricultural



sector: (1) provide abundant quantities of food, (2) provide foreign exchange through production of export crops, (3) provide a source of labor for industrial expansion and (4) provide a source of domestic capital for economic development. However, if all of these were to be achieved simultaneously, conflicting policy decisions would usually emerge. For example, the first objective, that of providing abundant quantities of food, can be achieved either through policies for promoting domestic production or through imports. The extent to which many of the underdeveloped areas should seek the goal of self-sufficiency, or even relative self-sufficiency, in food production is not clear.

Obviously one of the reasons for wanting an adequate supply of cheap food is to enable an economy to compete in the production of industrial goods, as well as to reduce political and social unrest on the part of the great masses of the population. Therefore, the objective of providing adequate supplies of food through domestic production can conflict with the second objective, that of providing foreign exchange. In many cases, a country must choose between using its agricultural resources in the production of crops for export or in the production of crops for domestic consumption. It then becomes a matter of policy to decide whether emphasis should be given to import substitution or export expansion.

The third objective, that of providing a source of labor for industrial expansion, has traditionally been accepted as one of the roles that must be played by the agricultural sector if overall growth is to take place. However, this seems a little strange for many of the underdeveloped areas of the world where great masses of unemployment exist, not only in rural areas but also, and perhaps to a greater extent, in urban centers.

This traditional goal of supplying labor to urban centers is beginning to be challenged in some quarters as an appropriate objective for the agricultural sector, with the reverse goal being suggested as a more appropriate objective; namely, that of absorbing and keeping in rural areas the excess labor that cannot be employed in agriculture. The reasoning is that great masses of unemployed people in heavily populated urban centers may actually hinder rather than induce development, for the heavy influx of migrants from rural areas may place undue strain on social overhead facilities as well as becoming potentially dangerous causes of revolution.

The final traditional factor listed, that of providing domestic capital for economic development may also conflict with the goal of increased agricultural output since the agricultural sector itself needs capital in order to develop.<sup>1</sup> In fact, there are many proponents of the argument that capital needs to be transferred from the nonfarm to the farm sector in order to speed up the process of agricultural development.

### Coordination of Objectives

This is not meant to suggest that these various objectives must be incompatible with one another, but rather that the desired results will not likely be achieved

<sup>1</sup> This is not meant to suggest that increased agricultural output cannot occur without heavy infusions of capital. Actually the opposite viewpoint is held by the author, as spelled out in an article, "Algunos Aspectos del Uso del Capital en Relacion al Desarrollo Agricola de America Latina," *Economica Latinoamericana* 1(1). Sept., 1963. The argument is made that use of "strategic" capital inputs — fertilizer, pesticides, etc. — can make possible significant output increases, and that the needed capital can largely come from current production or existing credit facilities with only minor modifications. The statement does imply, however, that considerable capital is required for agricultural development encompassing irrigation, roads, market facilities, etc.

unless careful attention is given to the areas of potential conflict and consistent policy decisions are developed. It is recognized that not all of these goals can be resolved by economists, for many of them have political and social overtones which must be resolved at least partially on noneconomic criteria. In the democratic process, we like to think that this is done at the ballot box, but the use of the ballot box does not relieve the economist of the responsibility of showing the consequences for the various lines of action which might be taken.

Research to analyze the implications of the several policy objectives set for the agricultural sector should prove most useful in speeding up agricultural development and providing exciting and stimulating activity for economists interested in economic development.

As an example of what can happen when these broad policy objectives are not coordinated, let me cite the experience of one country which has recently prepared a plan for economic and social development. I have not studied the plan in detail, but from a superficial look at the agricultural part I was impressed with the attention given to describing the present situation as accurately as possible. This was then used as the foundation for projecting output on the basis of yields from experimental results and from improved practices presently in use on the better farms. The projected increased output appeared to be attainable and it would result in increased levels of income and living for the members of the agricultural labor force. The plan adequately met the goals of increased food supplies for both domestic consumption and export.

Mechanization, an integral part of improved practices and high yields, was not only one of the main factors making for increased output, but it also made

possible a reduction in the agricultural labor force, thereby releasing labor for industrial expansion. However, unemployment is one of the problems facing the country, and it appears that the country can ill afford to substitute capital for labor under existing conditions.

Mechanization, however, greatly increased the efficiency of the farm labor force, so that total man-days of work needed to bring about the increased output projected in the plan only rose from 70 million to 120 million in a 10-year period. However, the plan projected such efficient labor use that while man-days of work increased, the number of people working in the agricultural sector actually decreased from 800,000 to 450,000 during this time. This came about since the average days worked per man increased from 90 to 270.

From the standpoint of increasing per capita farm incomes, the projected plan was quite successful. However, in the process of increasing agricultural output and per capita farm incomes, attention was diverted from two other aspects which might conflict with overall goals for economic and social development.

One of these concerns the welfare of the approximately half million people who would have to leave the agricultural labor force as the result of farm mechanization, since industrialization does not appear able to provide this number of additional jobs.

The other aspect is the shortage of capital. For instance, it is estimated that a \$5,000 investment is needed for each new industrial job created. Yet, the capital which might be used to create employment for displaced farm workers is projected for use in mechanizing agriculture. This suggests the problem of how best to allocate scarce capital. However, before the optimum allocation can be made, information is needed on the



returns to capital invested in agriculture compared to that invested in industry. Attention needs to be focused on determining the returns to capital in alternative uses if scarce capital is to be correctly allocated. It is not sufficient to know that returns to capital invested in agriculture are positive.

Optimum capital allocation also requires information on returns earned from alternative investments. For instance, data are needed on rates of return earned by capital invested in farm mechanization, construction of fertilizer plants, markets, irrigation, factories for light and heavy industries, and rural versus urban infrastructure such as schools, housing, roads, electricity, etc.

One area requiring research attention is the effects of mechanization on yields. Often when considering the economics of mechanization an assumption of capital-labor substitution along the same production possibility curve is made. However, this may not approach the real situation for many underdeveloped countries. Tunisia is one example. On my recent visit there, these figures were presented relative to wheat yields and improved practices: yields on farms using improved practices were five times higher than on farms using traditional practices. For example, advanced practices yielded 15 quintales of wheat per hectare, medium practices 12, and traditional methods 3 quintales per hectare. Practices used to achieve these higher yields included the use of improved seeds, fertilizer, crop rotation, insect control and mechanization.

Obviously, not all the increases in yields can be attributed to mechanization, but the thinking was that mechanization was essential to implement some of the other practices. For example, tractors were reported to be needed for deep plowing and proper seedbed preparation

to better control moisture and weeds. Mechanization was also reported to have a positive effect on yields by making it possible for work to be done at the most appropriate time, since the Tunisian climate is such that the optimum time for performing certain tasks is of rather short duration. Experiments need to be conducted to determine the extent to which mechanization contributes to increased yields, and the extent to which it is primarily a labor substitute, before the real cost of mechanization can be determined.

While this is essential information, it provides only part of the solution, for the capital allocation problem cannot be resolved apart from the labor allocation problem. Therefore, other studies need to be made concerning the best use of labor resources, not just from the standpoint of the welfare of those remaining in the agricultural labor force but from the standpoint of total society as well. In this respect, the work of Folke Doving on the relative size of the farm labor force as an important dimension in agricultural development should prove quite useful. For instance, what are the relative costs (benefits) of programs designed to encourage excess farm labor to stay on the farm — or at least not migrate to major urban centers — compared to the costs (benefits) of providing the necessary urban infrastructure to accommodate these people and prevent political and social unrest from developing.

### **Developing Appropriate Objectives**

The proper concern in developing policy must be for the future welfare of all persons now in the farm labor force (even though some of them may later change to nonfarm employment), not just for the welfare of those remaining in agriculture. Many programs appear to ignore this aspect and seem to be directed

primarily toward improving the lot of those remaining in agriculture, apparently forgetting the many who will migrate to villages or urban areas, as well as that part of the rural population not included in the agricultural sector. It is easy to show that the simplest way to improve the conditions of people remaining in agriculture is to devise ways to speed up the movement of people off farms, thereby eliminating unemployment and underemployment in agriculture. But what happens to the welfare of those people who migrate off farms?

I would urge that in our research efforts some attention be given to developing consistent, compatible objectives for the agricultural sector along with appropriate policy measures to achieve them. Care should also be taken to insure that these goals are consistent and compatible with plans and programs for overall national economic and social development. This would then set the broad parameters within which agricultural development must take place, and provide the framework for answering questions such as the relative emphasis to be given to the commercial versus subsistence sectors, and within the commercial sector whether production for export or for internal consumption should be emphasized.

Programs to achieve these objectives can take many and varied forms. In writing papers on policy, the temptation is to become a purist and make suggestions such as "policy measures ought to be consistent and should reinforce each other in the attainment of compatible goals and objectives."

This advice might mean, for instance, that policy measures should not be designed whereby one is directed toward transferring capital into the agricultural sector (to induce greater agricultural output) while another has the objective of transferring capital out of agriculture

(to speed up the industrialization process). Obviously, while capital can be transferred into and out of agriculture simultaneously, the end result of such apparently conflicting programs must be a net transfer either into or out of agriculture; it cannot be both. However, the net result of capital transfers may be of less importance than the fact that capital is induced to move from less productive to more productive uses. This may most easily be accomplished through a series of measures which have apparently conflicting end results rather than policy measures which permit only a one-way movement.

It is in resolving problems like these that the economist is only too happy to have the assistance of experts in other fields. I say "too happy" for I am afraid there are cases where economists use other disciplines as a crutch and an excuse for not working out answers to difficult problems. The field of incentives is such an area. Economists want (or need?) the economic rational man to populate his universe, with the goal of profit maximization guiding everyone's actions. In this setting, manipulation of factor and product prices, combined with taxes and subsidies, can provide the needed incentives to induce fairly rapid shifts in the manner in which resources are used.

But at the present state of knowledge of underdeveloped areas, we are not sure to what extent these societies act as rational, profit-maximizing groups. Therefore, doubts arise concerning the role and effectiveness of price and income incentives in inducing shifts in resource use, with the result that the problem is passed on to other social scientists. To avoid any misunderstanding, let me say that I welcome the presence of social scientists from other disciplines, both as they work independently and in an interdisciplinary



way, but I also think that economists have often stopped short of where their kit of tools could take them. For an illustration of how far the economist can go in this direction, see the recent book, *Transforming Traditional Agriculture*, by T. W. Schultz.

### **Determining an Acceptable Rate of Growth in Output**

Turning to another point, I would like to challenge you to work on determining an acceptable rate of growth in output for the agricultural sector. Here I think you must decide whether the criterion is to be the performance of the agricultural sector as a biological process subject to certain natural laws of plant and animal reproduction and growth, or the need for certain quantities of food and fiber to feed a given number of people and furnish a certain amount of foreign exchange.

In the former case, the rate of increase in total output may be the appropriate measure, and, if so, many of the underdeveloped countries compare quite favorably with the performance of the agricultural sector in developed economies. However, if the criterion is need, then change in per capita output is the better measure, and here most countries have a very poor record. It should be remembered, however, that the record is poor primarily because of a variable exogenous to the agricultural sector, namely, the rate of population growth. I raise this point for I think it may help to put in proper focus the problems of agricultural development.

Agricultural plans often project increased agricultural output on the basis of per capita requirements, but is there any logical reason to expect that agricultural output is principally a function of population? This could, of course, be the case where there is a lot of unsettled,

fertile land. Honduras may, in fact, be such a place, for there agricultural output seems to have been closely related to population growth. But some other countries do not have large areas of unsettled, fertile land as does Honduras. These comments are not made to suggest that trying to find the key to greater agricultural output is futile, but rather to encourage studies which can guide planners in setting realistic targets for the agricultural sector. If in the meantime greater output is obtained, much less harm is done if plans underestimate rather than overestimate agricultural growth rates.

### **Problems of Aggregate Data**

Before terminating our discussion of policy and research needs at the national level, some comments on difficulties involved in working with aggregate data may be in order. I would like to dismiss the topic by saying that there are no good data and move hurriedly on to something else. But, if work is to be done in the area of agricultural development, we must accept the fact of inadequate data and use whatever figures are available.

Actually, the fact that data exist, in itself, often presents a problem, for in many cases, data are superabundant in the sense that there may be several series depicting the same thing, with each series different from the others. The researcher is then faced with the problem of either selecting one set of data or modifying all of them to construct his own. One must be prepared for additional frustrations too, for not all series-makers are kind enough to include information on how the data were put together. One then has the choice of either taking them or leaving them. In this connection, I would urge that investigators be quite meticulous in showing exactly how each figure presented was calculated. This will

serve the dual purpose of permitting others to evaluate whether the figure is the measure needed for their work, as well as setting an example for research workers in less-developed countries.

The difficulty of compiling accurate national statistics on acreage, yields, and total production in countries where a large part of agricultural output never enters market channels is readily understood. Likewise, where price data are almost nil, one can appreciate the problems encountered in trying to calculate an output index. However, even though the margin of error may be great, these crude estimates are better than none and provide the basis for at least a beginning analysis of the process of agricultural development in that country.

### Micro Analysis

In addition to working on policy measures related to the function and role of the agricultural sector in the overall plan for economic and social development, appropriate policy measures must also be developed to insure that these objectives are reached.

In this context, I would like to make the big jump from a consideration of aggregates at the national and sector level to studying the behavior of individual farm units. Attempts to explain the performance of underdeveloped economies have largely been made in terms of macroanalysis, with relatively little attention given to lower levels of aggregation. However, increases in agricultural output are not the result of some action by the agricultural sector, but rather are the result of actions taken by individual farmers. Even though this is where production increases are born, little is known about production possibilities in terms of physical response, costs and returns, factor substitution, scale effects, etc. Without these data, however, it is difficult to go the next step of making the correct

selection of enterprises and the most efficient allocation of resources.

Important and basic as research on these problems is, there remains another area still more basic — that of getting a plow in the farmer's hands and seeds and fertilizer in his furrows — which also merits much more attention than it is presently receiving.

In order to adequately work on these problems, research activity must leave the capital city and be carried on at the village and individual plot level. This may appear to be a rather hopeless task, for while the data needed to carry on aggregate analysis are often quite inadequate, they are usually superior, both in quality and quantity, to data needed to carry on analysis at the farm level. In many cases farm-level data are almost nonexistent. However, one needs to keep the proper perspective and remember that the problems and opportunities facing farmers in underdeveloped economies are quite different from those facing farmers in developed countries, for the magnitude of expected changes in output varies greatly.

In developed economies, the innovator may strive to get a 5-, 10-, or 15-percent increase in yield, whereas in underdeveloped economies improved practices are expected to result in 2-, 5-, or 10-fold increases in agricultural output. To work on problems of agricultural production and efficiency of developed countries, marginal analysis — “a little more or a little less” — has significance, but this has little relevance for solving problems of underdeveloped countries. This does not mean that the principles and concepts of marginal analysis are not appropriate and useful; they are. What it does mean is that the degree of precision needed is much less. In working on problems related to low productivity, one does not need the precise data required for similar research in developed economies.



I can use an example from Chile to illustrate some of the difficulties of working at this level. Among my chief sources of data when working in that country were the records kept on a 100,000-acre corporation farm. In return for access to their records, I was to assist them in working out the optimum enterprise combination and the most efficient methods of production. Cheese was the chief product sold. This was manufactured on the farm from a herd of some 5,000 cows divided into 50 different milking units. Most of the land was in pasture, wheat and oats.

The problem was to determine the optimum number of cows and acreage of wheat, oats and pasture, which was never accomplished. After much study of the problem from their record books (which contained sufficient data to calculate fairly accurate enterprise costs and returns information) and from several visits to the farm (which afforded me the opportunity to observe work procedures and practices) I concluded that given the confines within which management chose to operate, net income and output could both be increased by means of the kind of reorganization the management wanted and that this would result in increased returns to the owners.

However, the increase in income brought about by these changes would be negligible compared to what was possible if some fairly simple yet fundamental changes in practices were made.<sup>2</sup> These changes would have been practically costless from a monetary standpoint, but apparently carried a high price in terms of employer-manager-peasant relation-

ship, beliefs and traditions, method of wage payments, etc., for management refused to make them. Rather they wanted a high-powered (preferably electronic computer) linear-programming-type solution which would tell them the exact number of cows to keep along with the precise acreage of pasture, wheat, and oats. They did not, however, want changes that would affect the grassroots of production. Neither very precise data nor highly sophisticated techniques of analysis were needed on this farm to effect really significant output increases, yet management wanted no simple solution.

There are two points concerning this example which I would like to stress: (1) the pressure that is often generated for sophisticated studies, similar to those carried out in highly developed agricultural sectors, even though they may be quite inappropriate for reasons of inadequate data, relatively high cost, and inability to properly apply the results; and (2) the importance of the individual farm worker, be he owner or hired labor, as a prime factor determining the final level of output and efficiency.

A story from a research project on how decisions are made in traditional agriculture reports that the absentee landlord, while thinking that he makes the decisions concerning what to plant, how to plant it, and where to plant it, was correct on only one count. Crops were planted in the fields he designated, but it was the actual laborers who in the final analysis decided what seed would actually be placed in the ground and the method of placing them there.

### Project Analysis

Having established, I hope, the importance of greatly increased research effort at the micro or farm level, let me urge equally the need for research in an

<sup>2</sup> Examples of the kind of changes suggested are: change from once-a-day to twice-a-day milking, separate calves from cows, prohibit beating and exciting cows at milking time, select herd on basis of milking ability, keep breeding and milking records to base selection on, and institute pay incentives for milkers and those responsible for the dairy.

area which to date has been almost completely neglected. This concerns how to relate and tie together the results from macro and micro studies.

It is useful and necessary to know the increased quantities of agricultural output needed to meet future demand (which also needs to be estimated), and how much of the increased output can come from increased yields and how much must come from additional land area. Likewise, it is useful to know the additional quantities of capital and credit required for the purchase of improved seed, fertilizer, machinery, gasoline, etc. to achieve higher yields, and the additional marketing facilities needed for successful marketing of the increased output. But the question still remains: How do we induce traditional agriculture to adopt on a large scale the improved production practices which are successful on a few farms? Is there one factor — be it land reform, improved marketing, sufficient credit, more education — which will act as the catalyst and kick off the process? Or must there be a bundle of things, and, if so, what are these factors and how should they be tied together?

Perhaps a fruitful avenue of approach would be project analysis of programs completed or now in progress. For instance, how effective was Plan Chillan in changing traditional farming practices in the central valley of Chile? Did output and incomes increase after the program was started, and, if so, can these increases be attributed to the program? What is the relevance of techniques used in the program to other areas? Another important but very difficult question: Could the resources in Plan Chillan have been invested some other way to have produced even greater results? A study of the package program in India to answer similar questions might also prove very useful in throwing light on the con-

ditions necessary for inducing development.

The USDA is now engaged in a study of factors associated with differences and changes in agricultural production in underdeveloped countries. As part of this study, a comparative analysis will be made of yearly changes and long-term trends in agricultural output and productivity and of the technological, economic, and institutional conditions associated with these differences. It certainly is our expectation that out of this will come some insights into the factors responsible for growth and stagnation.

### Specific Program Area

Having touched on problems associated with various levels of aggregation, I would now like to turn to one specific problem area — the manner in which output moves from the farm to the consumer.<sup>3</sup> It is my belief that improvements in the marketing system hold forth more promise as a way of increasing food supplies in the short-run context of two to four years than do improvements in practices used to grow the crops. This is one of my hypotheses, and I state it not to be challenged on whether improved production or marketing practices are more important, but rather as a way of emphasizing an area which until recently was almost completely ignored.

Let me caution you, however, that present U.S.-type market research is not what is needed in most underdeveloped countries where marketing practices are often tied to land tenure or credit arrangements as well as to social and religious activities. Likewise, cumber-

<sup>3</sup> Marketing is just one of many such areas which need investigation, but time does not permit their elaboration. For instance, land tenure problems have been purposely ignored in this paper, not because they are unimportant but rather because your program committee saw fit to devote part of the program specifically to them.



some marketing systems have also often evolved as a way of mopping up some of the excess labor supply. Availability of food, storage facilities, climate, religion, and other cultural patterns have all interacted to form tastes and preference for certain foods and dislikes for others, all of which influence marketing practices and procedures. The simple fact that individual households did not have refrigerators was finally hit upon as one of the main explanations of milk marketing practices in one city, and further that it was futile to try to develop a large fluid milk industry until home refrigeration became more common.

Improved marketing practices should not only reduce the cost of getting produce from the farm to the consumer but they should also encourage increased output. There is undoubtedly a vicious circle here in that lack of market facilities prevents increased output, while lack of volume hinders the development of efficient marketing facilities. How to break this circle certainly merits our research attention.

One of the big problems facing underdeveloped countries is how to integrate the traditional sector of agriculture into the market economy. Improved marketing practices should go a long way toward achieving this. At the present time, the traditional sector of agriculture has little choice with regard to the selection of either factor or product markets. An individual is usually faced with one buyer or seller, and in some cases these are the same. Buying basic needs and selling excess products are more or less routine acts not requiring any thought process. The peasant is really outside the process; in a large sense, he makes no decision other than deciding whether to buy or to sell certain goods. To a large extent, this is a routine decision, decided

more on the basis of custom than analysis. The concept of a price-quantity schedule is unknown to him, unless it may be the perverse backward-bending curve.

Unfortunately, there are too few studies which can provide the basis for challenging these hypotheses, and so I speak with some impunity. As an example of the wide latitude this area offers, I would like to mention one case where technical assistance sought to integrate subsistence people into the money economy through combined production-marketing assistance in the growing and selling of wheat, their principal crop. At various meetings of a group of subsistence farmers, decisions were worked out concerning the choice of seed, the proper way to plant and fertilize, and a workable schedule prepared for harvesting and selling the wheat, all as part of a joint effort. Arrangements were also made for the group to get a loan from the local bank to pay for the seed and fertilizer. However, there was one requirement which reduced the initial group from 30 down to 6: each person had to exercise the initiative of going to the local bank and filling out a standard loan application, arrangements having been made beforehand with bank personnel to give special consideration to this group. Even though this had been explained to them, the great majority were so far removed from the practices of the modern, money economy that they could not cross over into new territory—in this case the bank, which, of course, all had passed on the outside many times in their lives.

The point I am trying to make here is that relatively simple acts of association and participation in what are accepted routine practices to many of us, may be as important in integrating subsistence families into the market economy as

putting more money into their pockets. The marketing process seems like an effective way for these contacts to be made.

In closing, I would like to review briefly what I have tried to do. The assignment, as I interpreted it, was to discuss policy areas related to agricultural development in the context of giving direction to an agricultural experiment station research program on problems of agricultural development. In

doing this, I have tried to highlight some of the areas which appear to be either stumbling blocks to progress or key factors for rapid development. Therefore, in some cases I may have strayed from strictly policy measures into identifying what appears to me to be significant areas needing study. Certainly, however, the end result of a study in any of these areas should have strong policy implications, if not actual policy recommendations.

## Some Demographic Features of Underdeveloped Countries

B. D. MISRA

Department of Sociology, University of Chicago

**V**ARIOUS CRITERIA HAVE BEEN used to define an underdeveloped country. Among them are the economic (per capita income, etc.), social (status of women, etc.), cultural (proportion of illiteracy, etc.), or the ones describing the state of public health or population characteristics (average expectation of life, fertility, mortality, etc.).

Population characteristics, especially those related to the problem of population growth, have received wide attention from the economists, demographers, and planners in various countries. Not all of the underdeveloped countries face the pressure of population in the same degree. In those countries where the growth of population is rapid, a major share of the income will have to be spent for expanding the existing facilities rather than for improving the tools of production or the living conditions of the masses. Moreover, if the population increases faster than the national income, the living standard may actually fall.

Problems of population growth are being increasingly studied in the context of their relationship to economic development. If, along with the rapid growth of population, a country could achieve an equally rapid economic and social development, there would be no problem. Unfortunately, however, population growth proves a major hazard in economic development. Poverty, malnutrition, illiteracy, social retardation, and political instability are the features in countries with high birth rates. Poverty generates conditions that preserve poverty. And likewise population growth creates conditions that lead to continued population growth. Roughly two-thirds of the world's people live in the underdeveloped countries.

Table 1 presents the estimates of the past, starting with 1900, and projections of the future population for the developed and the underdeveloped nations of the world.

Let us next consider the demographic



Table 1. — Growth of Population in the Twentieth Century<sup>a</sup>

Year	Developed countries <sup>b</sup>	Underdeveloped countries			
		Total	Asia <sup>c</sup>	Latin America	Africa
Population (millions)					
1900.....	554	996	813	63	120
1925.....	700	1,207	961	99	147
1950.....	838	1,659	1,297	163	199
1975.....	1,115	2,741	2,107	303	331
2000.....	1,448	5,459	4,145	651	663
Percent increase					
1900-1925.....	26.4	21.2	18.2	57.1	22.5
1925-1950.....	19.7	37.4	35.0	64.6	35.4
1950-1975.....	33.0	65.2	62.5	85.9	66.3
1975-2000.....	29.9	99.2	96.7	114.8	100.3
Percent of earth's total					
1900.....	35.7	64.3	52.4	4.1	7.7
1925.....	36.7	63.3	50.4	5.2	7.7
1950.....	33.6	66.4	51.9	6.5	8.0
1975.....	28.9	71.1	54.6	7.9	8.6
2000.....	21.0	79.0	60.0	9.4	9.6

<sup>a</sup> Data for 1900-1950, enumerated or estimated; 1975 and 2000 projections based on high estimates.  
<sup>b</sup> Includes Europe, U.S.S.R., Northern America, Australia, New Zealand, and Japan.  
<sup>c</sup> Excludes the Asian portion of the U.S.S.R. and Japan.  
Source: U.N. Department of Economic and Social Affairs, *The Future Growth of World Population*. Table 5, p. 23, Population Studies No. 28, 1958.

characteristics of the underdeveloped countries.

Demographic Characteristics

**High fertility.** Populations in Africa, Asia, Latin America, and the non-European peoples of Oceania have high fertility patterns. Most of the countries in these regions have a birth rate of about 40 per thousand and an average of five children at the end of the reproductive period.

Fertility patterns within a country often show varying trends, and a knowledge of these differential patterns proves helpful in studying other phenomena. It is generally believed that urban dwellers have a somewhat lower birth rate than the rural population. However, the urban-rural differentials are not marked in all of the underdeveloped nations. This is because "in the economically advanced nations of the world, urbanization is both an antecedent and a consequent of tech-

nological advance and of a high level of living — a symbol of man's mastery over nature. In the underdeveloped nations, however, urbanization represents instead the transfer of rural poverty from an overpopulated and unsettled countryside to a mass urban setting. In the economically underdeveloped area of the world, urbanization is outpacing economic development and the city is more a symbol of mass misery and political instability than of man's conquest of nature."<sup>1</sup>

In Puerto Rico the birth rate of the rural population is said to be considerably higher than that of the urban population.<sup>2</sup> Studies conducted in India have observed higher fertility for the rural population, but the urban-rural differentials in fertility have not changed signifi-

<sup>1</sup> Philip M. Hauser, *Population Perspective*. Rutgers University Press. p. 22. 1960.  
<sup>2</sup> J. M. Stycos, *Family and Fertility in Puerto Rico*. Columbia University Press. 1955.

Table 2. — Population, Rate of Increase, and Birth and Death Rates for the World, Continents, and Regions (Selected Years)

Continent and region	Popu- lation 1961	Annual rate of increase	Birth rate, 1957-61	Death rate, 1957-61
		<i>millions</i>		
World total . . . . .	3,069	1.8	36	18
Africa . . . . .	261	2.1	46	25
America . . . . .	422	2.3	34	13
Northern America . . . . .	204	1.8	24	9
Middle America . . . . .	69	2.8	42	14
South America . . . . .	149	2.7	45	18
Asia . . . . .	1,721	2.0	41	21
Southwest Asia . . . . .	79	2.5	46	21
South Central Asia . . . . .	575	1.8	40	22
Southeast Asia . . . . .	223	2.3	44	21
East Asia . . . . .	844	2.0	40	20
Europe . . . . .	430	0.8	19	10
Northern and Western Europe . . .	143	0.7	18	11
Central Europe . . . . .	140	0.8	19	11
Southern Europe . . . . .	147	0.8	21	9
Oceania . . . . .	16.8	2.5	25	8
U.S.S.R. . . . .	218	1.7	25	7

Source: U.N., Demographic Yearbook, 1962, Table 2, p. 124.

cantly since 1900.<sup>3</sup> Fertility has been found to be inversely correlated with social position. "Agricultural peoples apparently have a higher fertility than the trading and professional classes, and within the agricultural category owners and tenants have a lower fertility than do field laborers. The child-woman ratio tends, also, to be inversely correlated with literacy."<sup>4</sup> Religious differentials in fertility are also an important aspect in the fertility pattern and are quite pronounced in some of these countries. Table 2 shows some of the fertility variations in the broad world regions.

**High and rapidly declining mortality.** In 1960 the death rate for the world was roughly 19 per thousand. Africa, Middle and South America, and Asia have much higher mortality rates than other regions (Table 2). However, many nations in

these regions have lately experienced a drastic reduction in their death rates. In Ceylon, for example, mortality was reduced by 50 percent in less than 10 years. This was made possible by the importation of low-cost techniques of public health.

A reduction in mortality in the advanced nations of the world was made possible by centuries of development in technology, productivity, environmental sanitation, hygiene, and modern medicine; the underdeveloped nations do not have to wait for these consecutive innovations. Major economic improvement may be a sufficient condition, but these days it is not a necessary condition for a decline to occur in mortality. It has been observed that the socio-economic policies that are directed towards reducing fertility in the long run will reduce the mortality earlier. In England, the birth rate began to decline more than a century after its death rate started declining. During the period of industrial-

<sup>3</sup> K. Davis, The Population of India and Pakistan. Princeton. pp. 70-73. 1951.

<sup>4</sup> U.N., Determinants and Consequences of Population Trends. p. 95. 1953.



zation, the population of Japan increased from 30 to more than 84 millions because the death rate declined much earlier than the birth rate. In the underdeveloped nations, mortality has been reduced by external factors, and these factors have not become an essential part of the overall process of social change.

**Rapid population growth.** Within the underdeveloped regions, population has recently been growing at a more or less rapid rate. The annual rate of increase in Latin America in the last few decades has been particularly rapid (Table 2). The United Nations estimates for future world population indicate further increases in the rate of growth of world population in the coming decades. Between 1950 and 1975 they forecast (based on their medium assumption) the annual rate of growth to be 2.1 percent, and between 1975 and 2000 the growth rate would go up to 2.6 percent. These rates would double the population in 33 and 27 years respectively.

These high population growth rates are the direct outcome of the high birth rate and a declining death rate. A few decades ago, both birth and death rates in these underdeveloped countries were high. The death rate was fluctuating with varying fortunes. The equilibrium was established at the high level of crude rates. This equilibrium was broken with the decline in mortality in the underdeveloped countries and with the consequent outburst of population growth.

Demographers have explained the population growth in terms of the transition theory. They trace this growth through various stages. The demographic cycle shows a sequence of high birth-high death, high birth-low death, and low birth-low death.

In an agrarian low-income country, the

birth rate is high and relatively stable, and the death rate, although high, is likely to fluctuate. Gradually the economy changes and the death rate declines, and somewhat later the birth rate begins to decline. Between the decline in the death rate and the decline in the birth rate, there occurs an accelerating growth in population. Most of the underdeveloped countries find themselves today in this transition period. Some of these lands have the death rates of advanced countries and birth rates of backward countries. Later on, according to the transition theory, the birth rate starts declining and the death rate either continues to decline further or remain stationary at a low level. The decline in the birth rate lags behind and finally, when the reduction in the death rate reaches its lowest minimum, the birth rate catches up with the death rate and a low stationary population is established.

The transition theory has been used to explain what happened in the past so far as population adjustment was concerned, but it may not work in predicting what might happen in the future. For this reason, the transition theory has theoretical significance only.

A point of interest in considering the difference in the population growth of the advanced and the underdeveloped nations is that the developed nations had their economic takeoff before their population explosion, while many of the underdeveloped countries are experiencing their population explosion before the takeoff.

**Young age composition.** A study of age composition of a country is important insofar as it enables us to study the pattern of life cycles. Individuals enter the labor force, end their education, marry, and leave the labor force at different ages. These phases of life entail

different aspects of human behavior, and the economic and social characteristics of the individual change as a consequence of the change brought about by varying ages. For this reason age is one of the first factors that must be controlled in all branches of research which involve the behavior of human beings before the effects or relationships between other less obvious factors can be assessed.<sup>5</sup>

In order to study the age composition of a population, the first thing that we should know is the proportion of the total population in each stage of the life cycle. Analysis will have to be made to see the various factors that are responsible for a given age composition. The three demographic components of growth—births, deaths, and migration—will have to be observed over a period of time. Differential birth and death rates produce differential wave patterns in the composition of the population at different ages. Migration, both in and out, likewise changes the age composition of the population. Let us see how the population components affect the age composition of the population.

In a situation of falling birth rates, the children would form a smaller proportion of the total population, while the proportion of people in the adult and older ages would go up. When the death rate at any age is declining, it will mean more survivors in the next age group, and this particular age group therefore will have a larger proportion of individuals. Differential reduction in the death rate has both direct and indirect consequences. A differential reduction in the death rate not only increases the proportion of individuals in the next age group, but also increases the proportion in all

later ages. Indirectly it will mean that in the case of individuals who are below 50 years of age, a decline in the death rate would enable more people to marry and procreate. Survivors in the reproductive ages would have this indirect consequence on the age composition.

Developed and underdeveloped countries show different trends in age composition (Table 3). In most of the underdeveloped countries, there is a higher proportion of children and youth and a smaller proportion of older persons. Those under age 15 often constitute about 40 to 45 percent of the total, whereas in the developed nations the percentage is roughly 25 to 30. The proportion of population in the working ages, particularly in the age group 20-44, is almost the same for all nations (roughly 30-35 percent). However, the underdeveloped countries with high birth and death rates have a much greater proportion of middle-aged population (in younger ages of the labor force) than the developed nations. This means that the proportion of seasoned and experienced workers in the labor force is less in the underdeveloped countries than in the developed countries. The relationship between high vital rates in the underdeveloped countries makes the age distribution of their populations relatively less advantageous.

The U.N. report emphasizes that "paradoxically, one of the chief obstacles to economic development is the manpower shortage which exists even in the so-called overpopulated countries. An initial difficulty is that, owing to the age structure of the population, there are not enough adults. Furthermore, because of certain social customs only a relatively small proportion of the adult population in some of the underdeveloped countries is available for employment which would

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<sup>5</sup> Donald J. Bogue, *Population of the United States*. The Free Press of Glencoe, New York. p. 92. 1959.



Table 3. — Age Composition of Selected Countries of the World

Continent and Country	Dependency ratio			Percent distribution by age				
	Total	Youth	Aged	Total	0-19	20-34	45-64	65+
Africa								
Egypt 1947.....	105.1	98.8	6.4	100.0	48.2	35.0	13.8	3.1
Algeria 1953.....	132.3	125.1	7.2	100.0	53.9	30.4	12.7	3.1
Nigeria 1952-53.....	121.2	115.0	6.2	100.0	52.0	34.2	11.0	2.8
Mozambique 1940.....	109.9	105.2	4.6	100.0	50.2	38.9	8.8	2.2
North America								
Canada 1953.....	86.1	71.6	14.5	100.0	38.5	36.2	17.6	7.8
United States 1953.....	77.0	62.3	14.7	100.0	35.2	36.2	20.3	8.3
South America								
Argentina 1947.....	80.8	73.8	7.1	100.0	40.8	39.1	16.2	3.9
Brazil 1950.....	122.0	116.7	5.3	100.0	52.5	34.3	10.7	2.4
Chile 1940.....	103.5	96.3	7.1	100.0	47.4	36.4	12.8	3.5
Colombia 1938.....	122.9	116.5	6.5	100.0	52.3	34.3	10.6	2.9
Asia								
Ceylon 1946.....	103.5	96.5	6.9	100.0	47.4	36.9	12.2	3.4
Taiwan 1953.....	124.7	119.1	5.6	100.0	53.0	33.9	10.6	2.5
India 1951.....	104.5	97.1	7.3	100.0	47.6	36.0	13.0	3.6
Japan 1952.....	99.2	89.2	10.0	100.0	44.8	35.1	15.1	5.0
Philippines 1948.....	138.3	130.7	7.6	100.0	54.9	32.6	9.4	3.2
Thailand 1947.....	127.8	121.9	5.9	100.0	53.5	33.1	10.8	2.6
Europe								
Austria 1952.....	66.7	48.7	18.0	100.0	29.2	33.8	26.2	10.8
France 1953.....	71.4	51.8	19.6	100.0	30.2	34.2	24.1	11.4
England and Wales 1953	66.1	47.5	18.6	100.0	28.6	35.5	24.7	11.2

Source: U.N. Demographic Yearbook, 1948-54.

Table 4. — Illustrative Projections of the Population in an Underdeveloped Area<sup>a</sup>

Projection A — Fertility continues unchanged.									
Projection B — Fertility falls linearly by 50 percent in 25 years, thereafter remains unchanged.									
	Year	0	10	20	30	40	50	60	150
<i>population in thousands</i>									
Projection A	0-14	434	616	870	1,261	1,840	2,655	3,848	110,700
	15-64	534	718	996	1,406	2,003	2,901	4,204	120,800
	65+	32	43	65	90	132	180	245	14,000
	Total	1,000	1,377	1,931	2,757	3,975	5,736	8,297	245,500
Projection B	0-14	434	567	637	676	783	901	994	3,014
	15-64	534	718	985	1,287	1,573	1,869	2,181	6,613
	65+	32	43	65	90	132	180	245	850
	Total	1,000	1,328	1,687	2,053	2,488	2,950	3,420	10,477

<sup>a</sup> Initial population 1,000,000 persons. Initial age distribution, fertility, and mortality typical of Latin America north of Uruguay. Mortality rapidly improving.  
Source: Coale, Ansley J., Population and Economic Development, *The Population Dilemma*, Prentice-Hall, Inc., 1963, p. 50.

contribute to economic development, even though in their traditional occupations they are far from being fully employed.”<sup>6</sup>

<sup>6</sup> U.N., Determinants and Consequences of Population Trends. p. 265. 1953.

Table 4 illustrates the population projections made by Coale, of an underdeveloped country with an initial population of one million (hypothetical). This table indicates the implications of population growth on the age composition, on

burden of dependency, and on growth of the labor force. Growth of population has, therefore, short-run, intermediate, and long-run implications. Projections based on two sets of assumptions — one where the fertility continues unchanged and the other where the fertility declines linearly by 50 percent in 25 years and remains unchanged after that — produce two widely different sets of age composition and total population, and hence problems to the country.

This table enables us to see the consequences of rapid and moderately growing population. In the beginning the younger population tends to increase faster in the situations where the fertility continues unchanged (high fertility), and consequently the burden of dependency tends to increase. Three kinds of dependency ratios can be used for analysis (Table 3). These are:

Dependency ratio

$$= \frac{\text{Persons under 20 and 65 and over}}{\text{Population 20-64 years of age}} \times 100$$

This is actually the sum of two parts, which can be studied separately:

Youth dependency

$$= \frac{\text{Persons under 20 years}}{\text{Population 20-64 years of age}}$$

and

Old-age dependency

$$= \frac{\text{Persons 65 years and over}}{\text{Population 20-64 years of age}}$$

Since the age of entrance in the labor force varies from country to country and also within a country (often because of differences between the urban and rural population), it may be necessary to vary the lower and upper ages used for the computation of dependency ratios.

After 30 years, population in the labor force age shows wide differences in the rate of growth because more people are in the reproductive age groups in a high-

fertility population as compared to low-fertility population, and finally the effect can be seen in the size of the labor force. In the short run not only does a population with reduced fertility enjoy the benefit of dividing the national product among a smaller number of consumers; it enjoys the additional benefit of having a larger national product to divide. The underdeveloped countries have a high density of population relative to capital.

High or low birth rates are crucial factors in determining the future pattern of most of the underdeveloped nations.

In the underdeveloped countries, persons dependent on agriculture make up roughly two-thirds of the total population. And despite the fact that in these countries a large proportion of the population is dependent on agriculture — directly or indirectly — food supply is barely adequate to meet basic needs, and for the growing population increased food production is the most essential need.

Table 5 shows the proportion of population dependent on agriculture in selected countries.

### Demographic Problems

In most of the underdeveloped countries the demographic statistics are scanty and often imperfect. Therefore, when dealing with any problem requiring demographic data, it is necessary to know the extent of accuracy provided by the data. This would permit deriving significant answers. Many procedures are used to test the reliability of the data. Among these are comparing the observed data with a theoretical expected shape, comparing the data of one country with data from another country with similar conditions, comparing the census figures with the data obtained for nondemo-



Table 5. — Number and Percentage of Population Dependent on Agriculture  
(Selected Countries)

Continent and country	Total popu- lation	Population dependent on agriculture	
		Number	Percent
	<i>thousands</i>	<i>thousands</i>	
<b>Africa</b>			
Algeria 1948.....	8,444	6,010	71
Congo 1947.....	10,753	9,084	84
Fed. of Rhodesia & Nyasaland 1950...	1,860	1,423	77
Nyasaland 1949.....	2,250	2,078	92
Sudan 1956.....	3,800	3,292	87
<b>South America</b>			
Argentina 1952.....	18,040	3,682	20
Colombia 1951.....	11,589	6,185	53
Paraguay 1950.....	1,397	784	56
Venezuela 1950.....	4,974	1,986	40
<b>Asia</b>			
Cambodia 1958.....	4,740	3,332	70
China (Mainland) 1948.....	456,841	395,500	85
India 1951.....	356,879	249,122	70
Japan 1960.....	93,406	34,546	38
Rep Korea 1955.....	21,502	14,481	67
Philippines 1948.....	19,137	13,267	69
Thailand 1950.....	18,488	12,211	66

Source: U.N., Compendium of Social Statistics. Table 8, p. 91. 1963.

graphic purposes, and by the technique of direct checks with balancing equations to test the consistency of increase in population at two different dates. This consistency can be checked by the simple equation of:

$$P_z = P_o + B + I - D - E \text{ where}$$

$P_z$  = Population at the second census  
 $P_o$  = Population at the first census  
 $B$  = Number of births during the intercensal period  
 $D$  = Number of deaths during the intercensal period  
 $I$  = Number of immigrants in the intercensal period  
 $E$  = Number of emigrants in the intercensal period

In most of the underdeveloped countries, registration of births and deaths either does not exist or is far from complete. If births are recorded better than deaths, the computed natural increase will be too high; and if the deaths

are better recorded than the births, the natural increase, thus obtained, will be on the lower side. However, if both the births and deaths are registered incompletely and the completeness of registration is of the same degree, the error in showing the natural increase will not be too great, as each will compensate for the other.

The predominant illiterate population of the underdeveloped countries furnishes inaccurate ages (sex, however, is accurately reported). This inaccuracy is reflected in the censuses in the forms of heaping of ages at certain digits, overreporting of ages (for ages 65 and over), underreporting of ages (for ages below 65), advancing of ages of young children, and refusal to report the age. The other type of inaccuracy results from underenumeration. The age misstatement occurs because of ignorance, negligence, deliberate misstatement and misunderstanding of the question. For

example, the population of Turkey of 1945 shows:

Age	Number of males (thousands)	Number of females (thousands)
40.....	244	409
41.....	73	30
42.....	90	48
43.....	76	39
44.....	59	31
45.....	201	260
46.....	68	36
47.....	47	25
48.....	55	40
49.....	30	17
50.....	158	350
51.....	36	21

The U.S. Negro population for 1930 shows a similar tendency of digit preference. These irregularities are errors in reporting. Therefore, before any analysis of these data is made, it is necessary to smooth or graduate the data so that these irregularities are removed. Various methods have been suggested for this purpose — graduation by Newton’s formula, osculatory interpolation, Sprague’s multipliers, Greville multipliers, etc. The graduation methods assume that the totals for various age groups — 5 years or 10 — are accurate. The total error in each age may be broken down into two components — age misstatement and underenumeration. Before we use the data it should be corrected for both kinds of errors.

When inaccurate ages are reported, one can compute the sex ratios for the country and for each of its parts or states. The purpose of computing the sex ratios is to state the degree to which people of one sex outnumber those of the other sex in a population. This is calculated as:

$$\text{Sex ratio} = \frac{\text{Male population}}{\text{Female population}} \times 100$$

The sex ratios need to be compared and evaluated. For a closed population, there would be about equal numbers of males and females.

It is also possible to measure the age

accuracy by means of an index. The index would enable us to see if age statistics in one census are better than those in the other, the extent of urban-rural differentials in age accuracy, etc. Among the various indices are the Whipple’s index,<sup>7</sup> Myers’ index,<sup>8</sup> Bachi’s index,<sup>9</sup> and the United Nations method of computing an index.<sup>10</sup> (For methods of computation, interested readers are referred to the sources.)

Besides the problem of misstatement of age, there is the question of underenumeration of children and underenumeration of births and infant deaths. Among the various methods of measuring the undercount of children are the birth-survival comparison, the registration-census comparison, and the post-censal quality surveys.

The United Nations has been very active in trying to find ways to remove the deficiencies in the demographic data of the underdeveloped countries so that such data may be meaningfully used in order to study other phenomena. Even for those countries which have very incomplete data, it is now possible to estimate, fairly reasonably, their demographic data.

Outlook for the Future

In the underdeveloped countries, communicable diseases have been or are being removed because of economic development. Reduction in the death rates has been speedy, while the birth rates

<sup>7</sup> George C. Whipple, *Vital Statistics — An Introduction to the Science of Demography*, 2nd ed. John Wiley and Sons, New York. 1923.

<sup>8</sup> R. J. Myers, *Errors and Bias in the Reporting of Ages in Census Data*. Actuarial Soc. of Amer. 41:411-15. 1940.

<sup>9</sup> R. Bachi, *Measurement of the Tendency to Round Off Age Returns*. Proc. Internat. Stat. Cong. Rome. 1953.

<sup>10</sup> U.N. Population Bulletin, No. 2. pp. 57-79. 1952.



have remained at the high levels. These countries have populations that are predominantly rural, illiterate, and too poor. The notion that fate determines the number of children one is going to have still prevails. It is argued, therefore, that the possibility of a fertility decline is remote and in the meanwhile the growth of population will be alarming.

However, recent developments in the field of fertility control in most of these countries are striking, and it may not be a surprise if many of these countries succeed in reducing their fertility without extensive urbanization or modernization. Social change is taking firmer roots in most of these countries, and their age-old traditions and values are changing. The people in most countries not only want progress, but expect it. The new generation is not ready to accept the traditional belief that fate determines the course of human events. At the same time, in these countries new forces are working to boost the fertility rates. Better medical facilities reduce the pregnancy wastage, promote sexual activity, and reduce widowhood. Therefore, where mortality con-

ditions improve and the birth rate remains constant, it should be implied that the conception rate is declining.

Such developments may have the cumulative effect of a fertility decline in the future. Many of these countries are experimenting with new techniques of communicating birth control information to couples and are taking bold steps to reduce fertility. A revolution in the attitudes of the people has already taken place, and this may lead to another revolution in the field of fertility control. National family planning boards are working with great vigor in some of these countries, and a breakthrough may not be impossible. They have the support of the government and private organizations. Educated people clearly see the possibility of having babies by choice rather than by chance. Better living conditions can be achieved by reducing the birth rate. An economic breakthrough from the state of underdevelopment and unemployment to a developed economy can be obtained by curbing the birth rate. Economic history and economic logic point to this inescapable conclusion.

## Labor Force Composition and Economic Structure of the Agricultural Sector

FOLKE DOVRING

Department of Agricultural Economics, University of Illinois

**T**O IDENTIFY, CHARACTERIZE, and measure the human element in the life and production process of the agricultural sector is more of a problem than is commonly realized. The search for well-defined statistical concepts merges with the quest for a deepening insight into the material and human conditions of the agricultural population and labor force.

Although a multitude of research problems are involved, this presentation will

concentrate on research necessary to characterize and measure a number of main subjects within the general area under review. Specifically, the following will be discussed:

1. The labor force committed to agriculture.
2. The population dependent on agriculture.
3. The supply of labor to agriculture, and its relation to actual input.

4. The social stratification of the agricultural population and labor force.
5. The degree of mobility among the agricultural population and labor force.

### **Labor Force Committed to Agriculture**

Several problems of definition and fact finding are involved in the very concept of labor force in agriculture. They derive in various ways from the difficulty of establishing who is working and not working in an industry where most people are self-employed in one way or another, and from the more or less widespread occurrence of part-time employment in more than one industry. For such and similar reasons, the data on employment in agriculture which we get from population censuses, agricultural censuses, and labor force surveys cannot always be accepted at face value; only seldom can they be interpreted without some analysis of the conceptual and factual background, and sometimes their true significance can be laid bare only at the price of a considerable research effort.

**The agricultural labor force as a residual.** In the older phases of economic development, those which we now term underdeveloped, agriculture was or is, in many cases, treated as a residual. Anyone, in rural areas, in agro-towns, or on the outskirts of cities, who has no other line of occupation, tends to be classified as working in agriculture, whether he is employed or not. All those who obtain some, even though brief and seasonal, employment in agriculture are then included with the agricultural labor force, even though they may do no more work in agriculture than some of those for whom agriculture is a secondary occupation. In contrast with other industries, underdeveloped agriculture can reject no one, "for where would the

rejected go?" (Louise Howard). Almost all current statistics on agricultural labor force include, silently and by definition, large numbers of people who, if they lived in an urban area, would be classified as "unemployed" or "unspecified." All of the following points must be read with this general difficulty in mind.

As an example we may quote the Turkish census of population (1960, 1955, 1950 . . .). In its classifications by industry or occupation, it includes a large residual of "unspecified." Closer inspection reveals that the "unspecified" individuals are numerous in urban and suburban areas, but few in purely rural districts with no major town. On the surface, this might indicate that the "unspecified" were mainly urban unemployed or unskilled workers. In reality, it is quite possible that the census takers were more ready to assign everyone, not otherwise classified, to agriculture in a rural area, but more often left open the category of occupation in areas where alternative jobs were available. The problem of assigning the "unspecified," to agriculture or otherwise, cannot therefore be settled merely on the basis of the information included in the census report, but also requires some of the background in the procedure for census taking and in the conditions for temporary farm and nonfarm employment in various parts of the country.

**Sex distribution.** In many countries, female labor is important in agriculture — in some even more so than male labor. In others, it is of small or negligible significance. In very few countries, however, is the material significance of female labor input anywhere near to being adequately reflected in statistics.

In some areas, local custom frowns upon the idea of women doing the work that men can do. The reply to a census questionnaire then is that the women do



not work, even though they do so in fact. In Spain, for instance, the numbers of women in agriculture are in some provinces returned as zero, in some others as equal to a small number classified as widows and farm operators, in still others as widows plus the number of female farm wage workers. In a few provinces, substantial numbers of farm women are returned as working. The latter is in an area where women customarily enjoy more civic and economic freedom than elsewhere in the country. The low figures in other areas may simply reflect an unwillingness to admit that the women are working. The matter can be established only by acquaintance with actual work practices. In the Sicilian latifundia areas, for instance, farm families live in very big villages ("agro-towns"), and only the men move intermittently to the areas of extensive field crops. The same is probably the case in some Spanish areas, but not in others.

The opposite extreme is seen in Greece, where often women are out working in the fields while the men spend hours on end in the coffee house. The numbers of women returned in the census as working in Greek agriculture are much smaller than the numbers of men so returned, and the former numbers have changed suddenly and haphazardly from one census to another. Admittedly, such employment figures are of little value.

Other forms of employment may be questioned. In some of the Arab countries, it is customary for the fellah to take his wife with him when he works in the field. She may not at all be needed there; he merely asserts his right of ownership. Is her participation in field work in this way a good reason for including her in the farm labor force?

Some agricultural chores, especially those with small animals and self-sufficiency horticulture, are not always

thought of as gainful work. Often they merge with household chores. Farm wives who do these chores are in many countries not returned as working. In the United Kingdom, for instance, there is no well-established information on the contribution of farm wives to work in agriculture. The question is why these chores, near the home and for the household, should be included in agricultural work any more than, say, milling rice or cooking preserves for the household is returned as employment in a food industry.

An extreme standpoint to the opposite effect occurs in Soviet literature on farm employment. Remarkably large numbers of women on the collective farms are returned as working on the "family plots." In some labor balance sheets, they are even shown as putting in full labor years in this activity, which then leads to the conclusion that labor productivity in such activities is exceedingly low. If these activities are instead treated as spare-time activities of housekeepers, a very different result emerges.

All of these observations lead to one significant conclusion: current data on female labor force in agriculture cannot be trusted; they have to be tested by means of inquiries into the realities of the agricultural work processes. These include the spread of the labor load over the year (sometimes with peak seasons so loaded with work that both men and women have to be active) and specific female chores in many countries and areas. Short of such information, it would often be safer to assume that the use of female labor in agriculture occurs in some characteristic proportion to the use of male labor. Especially when the labor surplus is large, it makes little sense to include all the farm women as active in agriculture.

A different situation comes up when

the sex proportion is abnormal in the agricultural population. Such can be the case after a major war (e.g., Germany and the USSR after World War II, and France after World War I), but also in the early phase of an accelerated exodus from agriculture, as for instance in Italy in recent years. In such situations, there will be certain symptoms of increased female work participation — more female farm operators, more cases where the male labor force is obviously insufficient in rush seasons, etc. Even in such situations, the census data are not of themselves trustworthy. A different formula must be used to estimate total labor force than in the case of more normal sex proportions. In underdeveloped countries, generally, this point is not as significant as it is among countries well under way toward an industrial economy.

**Age distribution.** The extent to which teenagers and very old persons are classified as working in agriculture is often not a reflection of their actual contribution to agricultural work. On the upper end of the scale, people past normal retirement age are more likely to retain token activity in agriculture than in other occupations; and some dually employed individuals go into semi-retirement by giving up their nonagricultural activities and continuing to work on a small farm. Sometimes institutional factors contribute. In countries under Roman law (the French civil code and similar systems), the old farmer always remains head of the household. For instance, the French population census regularly returns an impressive number of men aged 80 years and over and active in agriculture. In this age bracket, agriculture still appears to have the majority position it lost in France a century ago. These men are mainly *chefs de ménage* who formally retain the right of decision making. The recent decline in their number reflects a

socio-psychological change in the attitude toward retirement, rather than any commensurate change in the number of men actually at work.

The problems of farm work by children and teenagers are bigger and more widespread. Some labor input by youngsters is quite common, but how far does it justify inclusion in the labor force?

Children under 15 years are returned as active in small numbers only in the developed countries, and even there they usually show up relatively more often among farm than nonfarm occupations. In underdeveloped countries, by contrast, child labor is widespread and the actual numbers returned depend on several factors, among which are an arbitrarily chosen lower age limit for labor force participation, customary attitudes and taboos, and the degree of actual school attendance. Even here, data on labor force participation in agriculture are usually among the least reliable. The same techniques of testing may be tried as in the case of female labor. Usually the labor surplus still remains large even if all individuals under 15 years of age are treated as not belonging to the labor force.

The age strata between 15 and 20 years are often problematic in developed countries, but less in the underdeveloped ones, in which school attendance by farm youth past the age of 15 is rather exceptional.

**Dual employment.** Working in more than one occupation is frequent in countries on an intermediary or high level of development and also very significant in many underdeveloped countries. For instance, transportation jobs occupy an impressive amount of manpower in southern Asia, with much of the activity in the agricultural slack seasons; some food processing industries in the Mediterranean countries operate in part with farm



laborers, etc. Even among the aboriginal peasantry in Peru, seasonal jobs in other areas are by no means uncommon.

In both industrial and occupational classifications, dually-employed persons should be — and usually are — assigned one way or the other. One of the occupations is then supposed to be the “principal” one. In theory, the amount of non-agricultural, secondary employment might cancel out against the agricultural, secondary employment of those whose main employment is in other activities. Data on “main” occupations could then approximate the total supply of labor in agriculture and in other industries (in the framework of an industrial classification — for agriculture, however, use of occupational classification will usually make slight difference).

The criterion for assigning someone his “main occupation” is by no means self-evident. It is, for instance, not uncommon that an individual spends more than half of his time in agriculture but derives more than half of his labor income from other work. Which of the two occupations becomes “principal” then is a matter of judgment. The issue is further complicated if the person also has income from capital — rent or interest charge on owned land tends to merge with labor income from agriculture, especially in the underdeveloped situations (“peasant rent”). Often the judgment about main and secondary occupation is left to the individual to answer, and his reply may reflect a value judgment rather than the economic or work situation.

There are some specific situations which may invite a biased reply from census respondents. One of these is the season when the census is taken. A high season for agricultural work will attract more replies of employment in agriculture and a slack season vice versa, as is easily shown on the basis of labor force

surveys taken several times a year. Another one is the degree of unemployment in those industries in which farm workers find their second employment. In some countries, systems of unemployment insurance and social security may affect the tendency of dually-employed persons to report one occupation rather than the other. Changes in these conditions may then cause variations in the reported numbers of farm workers, without any commensurate variation in the actual distribution of workers or work input between occupations and industries.

**Reconciliation of sources.** Several of the problems of evaluating sources of data on employment in agriculture come into focus when data from different types of sources are juxtaposed and compared. The differences are sometimes exasperatingly large, even though usually more in level than in trend. The classical instance is that of reconciling a demographic census and a census of agriculture, but periodic labor force surveys also offer intricate problems of evaluation and interpretation. The best that has been done to date in reconciling a farm census with a demographic one is the “matched sample” that was drawn from the U.S. censuses of 1950. A similar exercise is in progress for the 1959-60 censuses. Even this matching is imperfect and regards only the “farm” population — a criterion of residence rather than occupation or industry — and does not encompass agricultural workers who do not reside on farms.

The agricultural census tends to include all those who do any farm work, and since it does not enumerate other occupations, there is no check on the adequacy of the assignment to agriculture as a main occupation. The population census, on the other hand, tends to include less detail on agricultural occupations, and for this detail we usually have

to consult the farm census. The latter, and followup sample surveys, are usually indispensable as a basis for balance sheets of total labor input in agriculture. These limitations on the various types of sources make it necessary to use them all. A research problem for the future is how common or "tie-in" questions should be formulated to allow the necessary reconciliation of data. "Tie-in" questions should not be formulated at once for all countries. It is likely that the adequate set of such questions will vary with the economic structure and the cultural conditions of different countries.

### **Population Dependent on Agriculture**

This concept is of interest for comparisons between per capita incomes in agriculture and in other sectors. If well defined, it may also be useful for projections of future agricultural labor force, at least in countries where there is no significant backflow of people into agriculture from other sectors.

The concept is usually defined as "those engaged principally in agriculture, and their dependents." Several countries lack any good data relating to this concept — among them the United States, where the criterion of farm residence has received more attention than that of livelihood.

The validity of the concept hinges first of all on the definition of labor engaged in agriculture (see the previous section). In addition, there is the problem of who is classified as a dependent. Young people who already have a source of income of their own, maybe outside agriculture, are often listed as "members of household" with their parents, and thus become included among the "agricultural population." Such data may exaggerate the number of farm youth and the "generation pressure" on farming opportunities. In France, for instance, the latest (1962) demographic census retains many young

industrial workers as members of the farm household in which they continue to live. This tends to exaggerate the number of people attached to agriculture. At the same time it distorts the age- and sex-specific activity ratios to the point of making them useless for projection purposes. Rectification of such data can be attempted to the extent that they refer to age brackets in which the labor force participation rate is known to be high. For data on teenagers, among whom activity rates are lower, and maybe varying with the degree of school attendance, rectification can be tried only on the basis of direct information on these conditions among specific and localized populations.

These problems of measurement are important in any country where dual employment is widespread. As already mentioned, this includes many underdeveloped countries. In such cases it will be necessary also to ascertain whether the engagement of young people in nonagricultural pursuits, while still living in their parents' home, is normally a way to leave agriculture, or only a passing stage in a mainly agricultural career.

### **Supply of Labor to Agriculture**

The mere enumeration of individuals working in agriculture, as their sole, principal, or secondary occupation, represents only a first step in measuring the amount of labor supplied to agriculture, and how it is matched against the normal labor requirements of the industry as specified by seasons and by kinds of work.

The minimum elements required to evaluate the agricultural labor force into somewhat uniform "man-units" are in the distribution of workers by sex, age, and degree of participation in agricultural work. With due regard to the conditions of each country, attempts are often made to measure the "man-year equivalent" strength of the labor force by assigning



“weights” to categories other than adult, able-bodied men.

Such weighting is always based upon the primary data on labor force and therefore suffers from the same weaknesses associated with those data. Especially the extent and real nature of female participation in farm work requires considerable fact finding before the assigning of specific weights to data on female workers has much meaning.

In some of the agriculturally advanced countries, data on labor supply to agriculture are refined by enumerating the amount of time which farm operators and their family members spend on non-farm work, or on work on other farms. The others are then assumed to be available for work on their own farms, whether used or not. For wage workers, the reverse approach is usually applied: their actual input of work on farms is recorded, but their idle time is not. Strictly speaking, the two types of data are not commensurable. Also, wage workers with agriculture as their main occupation ought to account for time spent on nonfarm work, the balance being available for supply to agriculture, whether used or not.

In underdeveloped countries, such refinements on the labor force concept are seldom very practical, so large is the farm labor surplus anyhow. Of more significance, in such cases, are specifications as to health and nutritional condition in addition to age and sex.

The incidence of endemic sickness is obviously of crucial importance to the real strength of a farm labor force. The percentage of the work force suffering from debilitating chronic disease, such as hookworm or elephantiasis, or how frequently malaria strikes, is even more important than age in years. Characteristic is a remark heard in Greece several years ago: previously when malaria was en-

demic, a household of five adults always had one person sick, while the other four were fully employed. Eradication of the malaria introduced underemployment to the extent of 20 percent! The actual incidence of disease, and how much allowance should be made for it, can of course be found out only by empirical observations in each area.

The nutritional level is even more puzzling. Food intake conditions work performance — but also vice versa — in the underdeveloped situation. In some cases, the sequence of events is as follows: undernourished workers perform poorly, and their marginal product is small. Naturally, they are paid (or earn, as self-employed) a low income for their labor days. This permits only a very small food budget, resulting in undernourishment, poor work performance, and so on. How to break this vicious circle is one of the major development problems. For short-run analysis it is necessary, however, to account for the lower strength of underfed workers, in order not to overstate the size of the labor force available, whether for expansion of agricultural production or for other development work such as road building, dam construction, or local industry.

### **Social Stratification**

A customary and widely applied first classification of agricultural workers assumes three basic categories: (a) independent operators, (b) operators' family members, contributing work on the family holding, and (c) wage workers. There are, however, considerable difficulties in separating the first two categories from the third.

**Farm operators.** This category may be uncertain as to its extent for two or three reasons: the operator may have so little independence from his landlord that he is in fact a kind of wage worker; he

may have so small a holding, and do so much wage work for other farmers, that wage work is his main occupation (or, at least, his main source of income); or he may have a retirement holding or other subsistence holding of such small consequence that he might not be included in the labor force at all.

The limit between "operator" and "wage worker" is particularly critical as regards sharecroppers who supply nothing except their labor. Whether they are enumerated as workers on their own account, or as employees, should in principle depend on their degree of freedom to make managerial decisions. The whole matter is often one of judgment, and even within a given country there may be subtle distinctions giving way to one interpretation or the other. A useful practice is to enumerate both concepts, as in the United States tabulation of "multiple-unit" operations in the southern states, or in the Portuguese enumeration of *seareiros*. In several countries, the distinction is unclear, however, and data on "operators" must be clarified by a rather full specification as to mode of tenure and type of contract. These specifications cannot in all cases be limited to standard descriptions; they must include the relevant economic data to characterize the socio-economic position of the various categories of farm operators, as well as the spread between larger and smaller farms within each of these categories. As a complement, hired workers also should be classified as croppers, cash wage workers, etc.

The second case is that of the person with dual employment within agriculture—partly as operator of his own small holding and partly as worker for wages. This category offers the same pitfalls as dual employment in general, plus the possibility of bias, which is usually in favor of the "independent" source of liveli-

hood. The season of enumeration is particularly likely to be of influence here, especially if the crops grown on the small holdings have a different calendar from that on which the larger farms usually employ hired hands.

Close to this case is the traditional one, which has now disappeared in most countries, of the wage worker whose wages in part consist of a small holding to cultivate whenever the contractual work obligation for the landlord leaves time free. Certain countries in Latin America still have this category to a sizeable extent. The case is really one of a separate social class, different from both operators and ordinary wage workers.

The retirement holding, or other small subsistence holding not associated with a labor contract, is more a problem for the estimation of total agricultural labor force than one of separating holders from wage workers. However, when all data on people who have such holdings are taken at face value, it may lead to an exaggerated idea of the relative place of independent operators in the country.

**Family members contributing work on the home farm.** One of the difficulties in connection with this category is that once these family members do any work at all on the home farm it may look as if the home farm were their main place of work, which does not really follow. Especially when young sons also take wage work on other farms, their condition of being mainly farm wage workers may become obscured by the fact that they reside on their parents' farm.

**Wage workers.** Apart from the problems already mentioned, there is also the question of the social identity of the farm wage worker, and his prospects as a future farmer. The genuine rural proletariat should be distinguished from farm boys and girls working away from



home but having some future claim to an inheritance which may or may not establish them as operators. The case is well described in some of the developed countries. In the underdeveloped ones, a better description of this condition would shed more light on the potential social mobility of the farm wage worker class.

### Degree of Mobility

The saying that farm people are irremediably sedentary and essentially immobile is an easily detected fallacy, but the real conditions under which people leave agriculture and take up a livelihood in other branches of the economy are elusive.

The reasons for limited mobility among the agricultural population are only in part the same in underdeveloped as in developed countries. Supersession of investments (both tangible and intangible), problems of financing and land market, and the specter of depopulation in rural areas are problems specific to the adjustment of agriculture in advanced phases of development, but they have little meaning in traditional peasant economies with their low level of investment and their generally crowded situation.

The *seasonal distribution of farm work* is in many cases a deterrent, if sometimes more in appearance than in reality, against movement of farm people away from their accustomed environment. Overcrowding discourages any tendency to economize with labor and encourages monoculture of basic staple foods. This tends to sharpen the seasonal peaks of the work year and thus creates the appearance of a necessity to retain all available hands on the farms. It would take some investigation to find out how genuine this difficulty is, or how readily the cropping pattern gets adjusted to seasonal labor shortages, either apparent or real.

Whether *age distribution* is as much of a brake on mobility in underdeveloped countries as it is in the advanced ones (it is very relative even there) should also be investigated. When a population is younger, a larger proportion might seem to escape this limitation. However, the aging of the mind is not necessarily a direct expression of physical age, and the whole question may also depend on cultural factors.

The *tenure system* can obviously affect labor mobility as well as the demographic trend. From several countries it is known, for instance, that owner-operators may have different attitudes both toward family size and toward mobility than either tenant farmers or landless workers. Also the specific inheritance laws which govern the transfer of farm land from one generation to the next tend to influence such attitudes. There are no general rules on this, however, as the attitudes vary with the general cultural setting. Identifying a specific factor in the tenure system as affecting mobility must therefore be done *ad hoc* in each case.

Factors in the *cultural level* are obviously significant, although it is much less clear how they work out. Literacy, market experience, and nonfarm work experience all affect the propensity to move or to sit tight, but again in ways which defy any too broad generalizations and require attentive study of the case at hand.

Literacy in the formal sense is sometimes less decisive than before, in the age of the village radio. Market experience should increase the responsiveness to incentives, but it may also sharpen the tendency to minimize risk, or at least render it more apparent than before. Nonfarm work experience, or exposure to more modern ways of production, may be complicated by the manner in which that experience relates to traditional ex-

perience. From India, some telling observations are at hand. The steel mills in southern Bihar had no impact on the ways of life and work in the surrounding countryside. The mills were too remote from traditional experience in the rather backward rural area where they are located, and a large part of the steel workers were recruited from other parts of India. Cottage industries of the handloom type also failed to spark any significant changes in the life of farming villages; they were too much a part of traditional experience to unleash any dynamic changes. Light factory industries in plants of moderate size, on the contrary, proved to have enough innovation in them to set the peasant mind moving, and yet were not so enormously remote as to bypass it.

A particular problem is connected with the occurrence of more or less pronounced cultural differences within a country. When an impoverished peasant population is set apart from the rest of the economy by barriers of language and cultural heritage, as with the Amerindians in the Andean countries, their mobility as

well as their advancement is up against extraordinary odds.

If at the same time this "dual economy" is characterized by differential fertility, the problem of mobility may be very difficult indeed. In less accentuated form than in the Andean countries, many countries have elements or vestiges of discrimination on the basis of diverse or provincial culture. As long as all rural areas remain crowded, the problems of labor transfers within the country hardly come up. But an advanced industrial development quite normally means shifts of emphasis in economic activity as between areas in the country, calling for labor transfers, first into the more vigorously growing cities and at a later stage also between rural areas. The dynamic changes going on in Italy reveal more of the contrast between provincial mores than was realized in a more static situation. The cultural problems of labor adjustment cannot always be solved merely by accommodation, but even less can they be neglected—least of all in research designed to prepare the ground for economic development.

## Farm Management Research and Agricultural Development in India

GEORGE MONTGOMERY

Department of Economics, Kansas State University

IT IS A PRIVILEGE TO PARTICIPATE in this conference on identifying research tasks for agricultural development, and to consider our opportunities and responsibilities in assisting in the development of agricultural economics in the low-income countries. In the training of students from the new and emerging democracies, as well as in other phases of this program, we should be asking ourselves if we understand the goals and

desires of these peoples, their culture and traditional background, and the problems they face in making the transition from a traditional to a commercial agriculture.

It is easy to underestimate the extent and nature of the problems of transition of an agriculture that has been rather static for hundreds of years. To a substantial degree, tradition, stability, and resistance to change have been the basis of security and continued existence. Fur-



thermore, it is difficult for us to comprehend the magnitude of the number of cultivators or farmers in countries such as India, which has 62 million cultivators, and 50 million landless laborers in rural areas. Three-fourths of the population cannot communicate by printed words, and a majority of the 560,000 villages are without electricity, motorable roads, and a sanitary water supply. When we comprehend the sincerity of these people to achieve change, we should be proud and thankful that we have the privilege of training leaders for these tasks. We should be profoundly concerned about giving them training that meets their needs, and not simply a stereotype program that has a standard content dictated by our advanced, specialized, highly commercial agriculture.

To focus our discussion and to stimulate questions on specific topics, I will discuss the following major aspects of identifying research tasks in farm management in low income economies:

- (a) the persons responsible for identifying the research tasks, establishing priorities, and conducting the research,
- (b) the extent and nature of the research tasks in farm management, and
- (c) our responsibility as teachers in the land-grant universities for training the persons who will be identifying the research tasks in the low-income countries of Asia.

My observations will deal essentially with India, for two reasons: (1) it was my privilege to work with 10 colleges in Andhra, Maharashtra, and Gujarat for four years, and (2) the economic problems of 275 million rural persons attempting to move out of a traditional agriculture provides ample material for discussion.

### **Responsibility for Identifying Research Tasks in Low-Income Countries**

It is important to indicate for whom the results of research are intended, and who should be responsible for identifying research tasks and establishing priorities in doing the research.

Research on use of resources, input-output data, and other development data are essential for establishing national targets, for other activities of planning commissions, and for use by research institutes of central governments. However, for the purpose of our discussion, I suggest we focus on the problems, limitations, and difficulties of individual cultivators. There are several reasons for this. In India, as in most low-income countries, the majority of the population is in the rural areas. The productivity and consequently the level of living is low. The solution to problems of hunger and poverty will depend primarily on the ability of individual producers to move from a traditional self-sufficient agriculture to a productive agriculture capable of providing food for the population and also savings for economic development.

Prior to independence and the introduction of the Community Development Program in India relatively little effort was directed to specific problems affecting the productivity of the millions of cultivators. Even now there is a need for better communication and increased understanding between those doing research and the persons to whom the results of research should be directed.

The most important group in identifying and carrying out research tasks in farm management are the economists at the agricultural colleges and in the state departments of agriculture and animal husbandry. In India there are 15 state departments of agriculture. The usual staffing pattern has an agricultural economist responsible for developing and di-

recting the research in farm management and other areas of agricultural economics. Also he is usually the professor of agricultural economics at the college of agriculture. Usually there is at least one agricultural economist at each of the other agricultural colleges in the state.

The extent to which all of these economists participate in the planning and conducting of research varies from state to state. Research schemes may be developed in cooperation with the Indian Council of Agricultural Research, and may receive allocation of research funds from the government of India. Teaching of farm management and agricultural economics is being introduced in the curriculum of the veterinary colleges. In these areas, organizational patterns and responsibilities have not been fully established and integrated between agriculture and animal husbandry. For example, Kansas State University has a farm management training project at the College of Agriculture at Poona, which provides for nine months of special nondegree study for state officers having responsibilities in various areas of management throughout the state. In the states developing agricultural universities, efforts will be directed to centering responsibility for both teaching and research in the Departments of Agricultural Economics.

The research undertaken by these economists should be oriented primarily to the solution of specific problems which villagers face in attempting to increase output. Of course some research will be undertaken in cooperation with the central government. Some schemes may be financed by the central government or carried out essentially for central research agencies. The results of research will also be used for teaching purposes. The point for emphasis here is that the research worker should direct his efforts to removing the restrictions that limit

increases in productivity. He has the responsibility of understanding the problems of the cultivator and devoting his efforts to research tasks that will increase food production.

It is difficult for U.S. economists to visualize the magnitude of some of the problems facing agricultural economists in the low-income countries. Many of the states in India have rural populations of 15 to 20 million persons. There may be three to six million independent cultivators in the state. While the overall system of farming may be relatively uniform, the type of crops and system of production vary significantly from region to region. There are problems of transportation, communication, and language that complicate the conducting of research. These place a premium on choice of the right priority and making the project simple and straightforward.

### **The Tasks of Farm Management**

The major task of farm management research in India is to facilitate the use of improved knowledge—the application of technology to the problems of increasing the output of food. The basic problem is assisting villagers to move from a traditional self-sufficient agriculture to a commercial agriculture producing for sale in a market. In considering the research tasks in a country such as India, there are a number of conditions and several questions to be considered. For example, Professor Schultz in discussing the content and relevance of “western” economics, asks: “Are the economic principles taught in the West really susceptible of general application? Or are they culture-bound and relevant mainly to industrial, capitalistic countries?”<sup>1</sup>

Such questions merit much more study

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<sup>1</sup> Theodore W. Schultz, *Transforming Traditional Agriculture*. Studies in Comparative Economics 3. Yale University Press. 1963.



and concern, especially when providing technical assistance and training young economists for conducting research on management problems. In considering the application of technology in India one is impressed with the extensive range of food production situations. There are areas of plantation agriculture and types of agricultural production, such as sugar cane growing, which are highly mechanized, capital-intensive and profit-oriented. These types of agriculture are concerned with essentially the same problems of profit maximization, input-output ratios, and rates of substitution as characterize western commercial agriculture. However, if we are concerned about research as related to production of food crops such as rice, wheat, jowar, and bajri, the basic system of agriculture differs greatly from the western commercial system of production.

The visiting specialist should keep the following differences constantly in mind when identifying and assigning priorities to research tasks in farm management:

(a) Production plans and actions in low-income countries are determined primarily by tradition and custom, rather than by decision or choice among alternatives.

(b) Noneconomic factors — such as social custom, village status, education and communication — are more important in production activities than in the West.

(c) Goals, desires, motivation, and response to incentives differ substantially from those which characterized decision makers in U.S. agriculture.

(d) Knowledge about risks, and ability and willingness to assume risks are extremely limited or nonexistent. Production for family food is primary.

(e) The range within which the cultivator can alter inputs, such as capital, fertilizer, and even improved knowledge,

is limited. In many instances quantities are fixed or allocated to him.

(f) Labor generally is abundant and underemployed, except at harvest, and cost is low relative to value or importance of the product.

In addition to these situations of the individual cultivators, there are overall or general influences which the researcher must recognize. The use of technology, or application of improved knowledge, by the average villager is a relatively recent development—since Independence in 1947, and especially since the inception of the Community Development Program several years later. Thus the research tasks generally center around the introduction of technology, rather than maximum use of given technology. Most of the application of technology falls in the stage of rapidly increasing returns. The priority research problems relate to introduction of practices, or initiation of new techniques, and not to refinement concerning the exact rate of use or determining the point at which an additional unit gives zero return. Much U.S. management research deals with a narrow range of application centering on the area of maximum return.

The availability, applicability and adequacy of data are other areas of differences. Often substantial quantities of data are available, but these may have been collected for general purposes, or for descriptive studies. Frequently these are not applicable, or not adequate for research on a specific problem. Further, there are limitations on collecting data for specific purposes. Communication, transportation, lack of trained workers, and illiteracy are influencing factors. In situations where a substantial portion of the product is for home consumption, the records and the judgment of the respondent are easily biased.

There is another area of substantial

difference which the farm management researcher may overlook. U.S. input-output studies, efficiency studies, and most studies relating to decision making, assume or take for granted a large range of influencing circumstances. These include availability of a continuous market, adequate transportation, storage, grading, competitive prices, and common if not perfect knowledge of prices. In addition to the lack of some or all of these facilitating services essential for commercial sale, the infra-structure of government may be inadequate or nonexistent in traditional economies. This includes laws, regulations, official weights and measures, and concepts of equity and justice in the marketplace.

These circumstances are major determinants in identifying research tasks and establishing priorities in traditional agriculture. For example, the most important management decision in producing milk for sale may not center around the number of cows or buffalo to be kept, efficient feeding, or a cost and returns analysis. The primary decisions may relate to having access to a market, how to provide transportation to the market, and the determination of the payment for transportation relative to the selling price of the milk.

A specific example may illustrate the nature of such priority. The only source of cash income of a villager 25 miles from Poona was the milk above family consumption from three buffalo, for which he received 5 annas per seer. In Poona milk sold for 11 annas per seer. Solving the transportation problem has first priority in this situation. Only then can the researcher be concerned with milk as an alternative enterprise, or a supplemental enterprise, involving studies of costs and returns and scale studies of the number of buffalo to be maintained.

This suggests that to introduce tech-

nology in such a situation the researcher needs to be an agricultural economist rather than a farm management specialist or production economist. It also suggests that, in solving problems of village production, the most useful tools are not the refined techniques developed to deal with problems of intensive production systems in which a high level of technology already has been applied.

In seeking to identify research tasks there is a tendency to assume that causes of low productivity in our agriculture are also causes of low productivity in low-income countries. One assumption is that low productivity is caused by inefficient use of resources. Neither observation nor research in India tends to verify this as a major cause of low income.

Ray Cray, who was in the Punjab five or six years as the group leader for Ohio State University, stated that in his observation Punjabi farmers made efficient use of the resources they had available. The Institute of Agriculture at Anand in Gujarat conducted studies in which plans were developed for farms of five acres. The director, M. D. Patel, used to challenge an American farmer to improve the efficiency of the organization of those farm plans. These observations are supported by the research of W. D. Hopper in Senapur District in northern India. Hopper concluded that "each man comes close to doing the best that he can with his knowledge and cultural background."<sup>2</sup> Bauer and Yamey present evidence which also supports this conclusion.<sup>3</sup> These are indications that studies of efficient use of resources are not the first priority in seeking causes of low productivity in the village agriculture in India.

<sup>2</sup> W. David Hopper, *Resource Allocation on a Sample of Indian Farms*. Univ. Chicago, Office Agr. Econ. Res. Paper 6104 (mimeo. 1961).

<sup>3</sup> Peter T. Bauer and Basil S. Yamey, *The Economics of Underdeveloped Countries*. Cambridge Econ. Handbook. 1957.



Studies of increasing inputs or of scale of operation likewise may not yield useful results for village cultivators. The majority of villagers are faced with rigid limitations on use of additional land, or even changing the pattern of fragmentation. Many villagers have financial or credit limitations for digging a well or obtaining an electric motor or engine for irrigation. Of course substantial additions to inputs are being made in the form of fertilizer, improved seed, and better tools. But even here, the deciding factor usually is availability, and not the question of optimum rates of application. The cultivator may have limited choice in respect to amount or rate of increase in these inputs.

Several groups of management tasks should be of special concern to agricultural economists when establishing priorities of research efforts. The traditional village agriculture of India emphasizes the production of rice, wheat, jowar, and bajri. The transition from traditional to commercial agriculture will give prominence to new types of production. These include eggs, milk for market, poultry for meat, fruits and vegetables for processing, and possibly fruit for export. This transformation already is occurring as evidenced by development of commercial poultry enterprises and the milk schemes around the major urban areas.

These new types of production have special significance for the economy of India. Larger quantities of such foods are essential for improvement of Indian diets. These enterprises are labor-intensive, require relatively small areas of land, and have short production cycles. However they present massive hurdles to the villager who seeks to undertake production for a market. For example, modern poultry production requires continuous accurate and complete adherence to specific requirements of nutrition, sani-

tation, and disease control. Furthermore, a number of auxiliary facilities, such as transportation, markets, and feed ingredients must be available.

These are complex requirements, even for industrious, intelligent villagers. Some of the requirements, such as transportation and markets, are group or community requirements. An industrious, intelligent villager who learned poultry production techniques by working two years with our poultry advisor, Dr. Earl Moore, took 400 chicks to his village 25 miles from Hyderabad. Inability to meet the problems of disease, transportation, and feed ingredients caused him to give up after rearing one batch of chicks. One of the major efforts of the agricultural economists at the agricultural colleges in India should be the development of information which will give the villager confidence and security in undertaking the production of milk, eggs, poultry, meat, and fruit.

Contribution to the expansion of these types of enterprises does not require the specialized efforts of the production economists, nor the refined techniques appropriate to the solution of "western" problems of production. The need is for guidance from economists, who are concerned with the "total problem" of providing credit, transportation, and markets. We must be concerned with developing information to demonstrate "pitfalls" as well as potentials for return to effort. The researcher needs to be dedicated to encouraging individuals to cooperate in establishing institutions and services which are prerequisites for producing for a market.

### **Responsibility for Training Identifiers**

When young economists from the low-income countries come to the United States for advance study, our concern should be to provide the needed training,

experience, motivation, and spirit of dedication to enable them to identify the important tasks and provide the needed information when they return to their home institutions.

Reference has already been made to the relevance of "western" principles to the economics of low-income countries. Wharton raises a similar question with somewhat different emphasis. In discussing development research in Southeast Asia, he comments: "Another frequent criticism of the Southeast Asian agricultural economists is their blind imitation of the research projects which are traditional in 'western countries' — a Southeast Asian agricultural economist trained abroad — sees what makes for 'success' within the profession and automatically desires to emulate; professional recognition and acceptance by his peers and his former teachers encourage him to adapt the same professional criteria of competence."<sup>4</sup>

These observations have significant implications for those of us who have opportunity to contribute to the training of international students. Wharton concludes: "The unfortunate feature of these efforts lies in the failure of the researcher to take the techniques and approaches and apply them imaginatively and creatively." As teachers and major professors of those who come to us, are we making *the important contribution*, if we do not stimulate originality and creativity, and develop motivation to improve the welfare of villagers in the countries to which our international students return?

The issues raised by Schultz and Wharton stimulate an appraisal of the training and especially the research experience of the students from India.

In the eight years since Kansas State University entered into the agricultural education contract in India, I have participated in the training of 15 students from India. I worked with four of these students who had appointments as graduate assistants, in four instances I was a member of the Participant-Selection Committee in India, and in one case I was the guide in the preparation of a Ph.D. thesis submitted to an Indian University. Two students are now on fellowships provided by their respective state governments, while the others are on their own financial resources. Four have returned with Ph.D. degrees, two have Ph.D. degrees from Indian universities, three are completing research for their Ph.D. theses, and the others have earned or are completing their master's degrees. Of those who are in India, two are in charge of developing programs in agricultural economics at new agricultural universities, and two are at central research institutes. The others are guiding programs of teaching and research at their respective colleges.

Here are 14 young men and one young woman who will provide leadership for research and teaching in agricultural economics in the 10 institutions with which Kansas State University has been cooperating. It is recognized that a health situation prevented an effective program for one, and that the opportunity for influence in another situation was quite limited. On the other hand three individuals spent essentially three years in residence, and three or four of the current group will have spent three years before returning.

How adequately have I fulfilled the opportunities available to me to influence the careers and contributions of these persons, whom we expect to be leaders, in the total area of teaching and research

<sup>4</sup> Clifton R. Wharton, Jr., Research on Development in Southeast Asia. Jour. Farm Econ. 45(5):1165. 1963.



in agricultural economics in their respective states? How adequately has the university prepared them for leadership in their economy and culture? What effort has been or will be made to continue communication with them?

If we apply Wharton's criteria of "imaginative and creative application of techniques" or his negative measure of "blind imitation of research projects traditional in western countries," my contribution is not commendable. Probably the only consolation is that we "are doing about the same as other institutions."

In my judgment the training programs mentioned have weaknesses both in the applied courses (those in agricultural economics) and in the research experience gained from the thesis research.

An indication of the research topics will illustrate the latter point. Among the topics on which Ph.D. theses have been completed or currently are in progress are the following: "The Domestic Demand and Price Structure for Different Classes of Wheat in the United States," "Inventory and Feed Reserves of Farmers Having Beef Enterprises," and "Influence of Weather on Variability of Crop Yields in Kansas." One thesis for which data from India were available was "Use of Dynamic Programming for India Farms." The thesis submitted to an Indian University was a Cobb-Douglas production function study based on available but inadequate data collected for other purposes from Indian farms.

It is natural and perhaps convenient to include in the programs of international students the same courses in agricultural economics that are required of U.S. graduate students. Agricultural Policy is a course of this type. In the fall of 1962,

I had Ph.D. students from India, Pakistan, and Egypt in Agricultural Policy. The typical course in Agricultural Policy, oriented to price and income policy under conditions of surplus production, makes a small contribution to the training of students from India where the urgent problems center on increasing output of food. Appropriate areas of study might be seminars or assigned reading on the relation of government to agriculture, dealing with such topics as education, land policy, incentives, motivation, and the role of agriculture in economic development.

If the state and central governments in low-income countries, where dollar exchange is critical, send their officers to us for three years for a Ph.D. degree and provide \$8,000 or \$10,000 for their support we have a profound responsibility to prepare them to be creative and imaginative in identifying research tasks. This is much more difficult and requires more time and funds than developing imitators. Imitators may have superior command of modern techniques and advanced procedures, but may lack the dedication to undertake research which does not require the use of computers.

Perhaps we should provide international students in farm management, especially those from the low-income countries, the lecture notes and papers of some of our early leaders such as Andrew Boss, George Pond, or G. F. Warren. Their research manuscripts might be an inspiration to those who return to serve in new colleges, where they have inadequate equipment and resources but have the responsibilities of assisting millions of cultivators free themselves from the limitations of low productivity.

# Farm Management Research and Agricultural Development in Latin America

D. WOODS THOMAS

Department of Agricultural Economics, Purdue University

**I**N MY ASSIGNMENT THE FOCUS is to be on economic problems at the farm level as these relate to agricultural development in Latin America.

The major aspects of this subject are so broad that they are clearly beyond the range of completely comprehensive treatment in a single paper, and of my first hand knowledge and experience. The discussion that follows is not offered as an all-encompassing and final judgment relative to the relationship between farm management research and agricultural development in Latin America. Rather, it is offered as a first attempt to identify sets of economic problems that (a) are common to major segments of Latin American agriculture (b) are both relevant and important to the more general problem of agricultural development and (c) are of such nature that farm management research might contribute in an important way to their solutions.

Given these limitations, I shall seek to satisfy the following specific objectives:

1. Point out a few important characteristics of the Latin American population of farm businesses and of the Latin American branch of the farm management profession.
2. Identify a few common, important problem areas that empirical research by the farm management profession could help resolve by providing relevant information.
3. Suggest an appropriate role that the U.S. farm management profession might play in the eventual solution of these and other relevant problems of farm firms in Latin American countries.

## Characteristics of Latin American Agriculture

The single feature that best characterizes Latin American farm businesses is variability. This exists in the extreme in virtually every aspect of farm organization, operation, and management with which the farm management profession is or might be concerned. It is not difficult to find farm businesses organized and operated on an economically rational basis. It is easier, unfortunately, to find farms that occupy the other extreme of the economic rationality spectrum. The range is great and there are farm units scattered over this range. It is probably true that the bulk of the population is situated more in the direction of the latter rather than the former extreme.

This variability is evident in such important characteristics as level of technology, management, economic efficiency, technical efficiency, size of operation, combination of enterprises, returns to factors of production, and income. One finds farm units employing the best known farm technologies and high-level management with resources combined in a way that tends toward maximization of economic returns to the resources employed. Other farm units employ the most primitive of technologies with little or no real management input, and operate in a frame of reference foreign to the notion of the profit motive — at least in the commercial agriculture sense. Farm units realizing high-level technical efficiency bounded by rational guides of economic efficiency are interspersed with those of extremely low technical efficiency bearing little or no relationship to



the concept of economic efficiency. The much-publicized *latifundio* with its associated economic and social problems is no stranger to the less-publicized but equally problematic *minifundio*.

These classical prototypes are not strangers to farm units that defy classification in this dichotomy. One finds farm businesses with enterprise combinations such that, given the relevant economic and technical variables, improving their organization would be difficult; others are characterized by enterprise combinations that appear to be totally unrelated to the dictates of economic optimality. Similar disparities in factor earnings and income are common.

The fundamental problem, however, appears to be not so much with the wide range of situations that exist in Latin America as with the distribution of farm units and agricultural resources over these spectra. It is probably true that these distributions are skewed in such a manner that the aggregate effect is one of the agricultural resources being allocated and utilized in ways that greatly reduce their *actual* relative to their *potential* contribution to the economic growth and welfare of these societies.

Another strikingly common feature of Latin American agriculture is the dearth of reliable economic information upon which managers might base decisions concerning the organization and operation of the farm business. Among the reasons for this are (a) the fact that no Latin American country has made investments in human resources, institutions, and systematic economic research of the form and magnitude required to produce certain kinds of needed information, (b) the inadequate and inefficient communication of economic information resulting from technological and organizational problems in public communication media, and (c) the high degree of

imperfection that characterizes both factor and product markets in many of these economies. Thus there are serious problems of imperfect knowledge, risk, and uncertainty with respect to significant economic variables such as factor and product prices.

Perhaps the most important phenomenon that characterizes much of Latin American agriculture is the increased economic, social and political pressure for *change*. This pressure has many sources and takes many forms but culminates in irrepressible forces for shifts in the allocation and utilization of agricultural resources.

The shifts will have an important aggregate impact on the economic, social, and political future of these nations. But we must not forget that the aggregate effects will be dictated, in large part, by the changes that take place at the level of the primary producing unit—in this case, the farm. The proportion of these changes that will result in sustained agricultural growth and in agriculture making meaningful contributions to general development of these economies will depend in some way on the kind and quantity of relevant economic knowledge provided through systematic research. Some of the most significant and useful economic information will be that pertaining to decisions at the farm level.

### Potentials of the Farm Management Profession

In examining our potential to provide needed economic information through systematic research, let us first consider the Latin American branch of our profession. There *are* well-trained, highly-competent Latin American agricultural economists. There *are* a few centers where the micro-economic problems of agriculture are being studied in a systematic manner. However, when one

compares the numbers of agricultural economists actively engaged in comprehensive, micro-problem research with the magnitude of existing problems and the need for information, the conclusion is that at present the Latin American branch of our profession lacks the manpower and ancillary research resources required to shed much light in the economic darkness that shrouds the farm businesses of that area. There may well be more professional talent assembled in this room today than exists in all the agricultural economics research institutions in any single Latin American country, and possibly all of Latin America.

Even under ideal working conditions, how great a contribution can a group of this size be expected to make to the solution of farm management problems of these nations? The sheer problem of *numbers* of trained farm management research workers is the reality that faces the Latin American branch of the profession. This must be faced squarely in our discussions today.

In assessing the potential of the farm management profession in Latin America, the "numbers problem" tends to overshadow most other factors affecting the potential. There are, however, several other variables that should be taken into account. One of these is the pervasive problem of multiple-employment. It is common practice for many agricultural scientists in Latin America to hold two or more jobs at the same time. To the extent that this is true of agricultural economists and that certain of these endeavors are not research oriented, the effective supply of human resources devoting their time to the discovery of new knowledge is reduced. In the universities there is a strong element either of part-time employment devoted largely to the teaching function, or for excessively

heavy teaching loads that permit little time for comprehensive research endeavors. Also, institutional arrangements and philosophical values tend to be such that research workers in the agricultural sciences are unduly insulated from the real problems of agriculture.

These factors, coupled with data problems, the lack of a solid historical tradition in research, and the lack of financial support for research further limit the potential of the farm management profession in Latin America. On the positive side, one must acknowledge the complete dedication of the small group that constitutes the hard core of the profession, the creation of a professional society, the numbers of young professionals currently being trained in graduate schools abroad, the development of formal graduate study in a few Latin institutions, expansion in problem-oriented research, and increasing awareness of the responsibilities and opportunities that face this profession in Latin America. These are good and positive signs. On balance, however, one cannot be both realistic and highly optimistic about the potential magnitude of the short-run contributions of the Latin American farm management profession to the solution of agricultural problems of the region.

Now, what of the U.S. branch of the farm management profession? Certainly it could make substantive contributions to the solution of farm management problems in Latin America—both directly and indirectly. It is also true that to the present we have made precious few contributions in this arena. There are, of course, good reasons why this is so, but at the same time we must recognize that Latin American agriculture has a multitude of farm management problems to which we might apply our talents and energies to good advantage.



#### Four Broad Problem Areas

There are many kinds of real problems in Latin American agriculture that might constitute meaningful and intriguing research tasks for members of the farm management profession and in which systematic study could make substantive contributions to agricultural development. The possibilities are virtually limitless. Generally speaking, we are dealing with a group of agricultural economies containing farm businesses beset with every kind of economic problem with which our profession has concerned itself and, perhaps, some to which we have given little attention. Too, these economic problems have been subject to very little systematic investigation.

To attempt to list individual research problems would be an endless task. However, it does seem possible to identify a few major types of problems that exist, in some form, in important magnitude in many Latin American countries. These broad categories of problems should provide us with useful insights into the potential contributions of farm management research to agricultural development in Latin America.

**Technology of agricultural production.** A major part of agricultural output in Latin America is being produced with production methods technologically inferior to those currently available and, more importantly, those that could be discovered through expanded research in the agricultural production sciences.

Most Latin American countries have not made the kinds of investments needed to produce a body of scientific knowledge upon which rapid and sustained agricultural development can be based. It is particularly significant, for our purposes, that a huge share of such investments have been in the technical agricultural

sciences to the virtual exclusion of research in the economic sciences of agriculture. The agricultural sectors of these economies are faced with limited information about fundamental production relationships and even more restricted information about the economic feasibility of alternative new technologies, levels of application of both old and new productive services, combinations of productive services, systems of organization and management, etc.

The importance of economic research in this broad problem area is supported by two major factors that appear to be acceptable at face value. One is that major improvement in the farm sectors of these economies will necessitate the rather wide-scale introduction of new technical systems of production. A second is that such widespread introduction of new technology at the farm level, while dependent upon many variables, is bound to be retarded until such time as the economic feasibility of these production techniques has been clearly demonstrated. Such demonstration can come about, on its own, through trial and error practices of the more imaginative and venturesome farm operators. This is a perfectly normal and natural procedure. By the same token it is an unnecessarily slow and costly procedure.

If farm management research has anything to offer, as I most certainly think it does, one of its more important contributions lies in the systematic study and evaluation of the economic consequences of adopting existing production techniques as well as techniques that are being or will be discovered. Such systematic economic analyses, and subsequent dissemination of the findings of these studies to the managers of farm businesses, could materially reduce the time period required to bring about economically desirable shifts in the produc-

tion functions of large numbers of farm units in Latin America.

**Enterprise combination.** A second broad problem that seems to be indigenous to farm units in many parts of Latin America consists of the economic questions associated with the enterprise combination phenomenon. Overt manifestations of this problem appear in the form of low returns to productive services, unemployment and underemployment of labor resources, land utilization patterns, price and income variability, gluts and famines in market channels, and the like. The presence of such problems in important magnitude in economies moving or attempting to move toward higher and different levels of economic activity is completely understandable. They arise out of a number of forces. Among these are shifts and changes in market demand for agricultural products; farm units moving from the market-insulated, subsistence sector to the commercial sector; land redistribution and colonization projects; population growth; demographic changes; improved transportation facilities; and technological advance.

Regardless of the basic forces giving rise to this problem, several things seem reasonably clear. First, substantive adjustments in the location of agricultural production and in the "product mix" of farm firms will take place in many parts of Latin America in the future. Second, there are major economic gains to be had through improved enterprise combination on many of the farm units constituting Latin American agriculture. Third, with increased rates of general economic development, problems of enterprise combination will likewise increase. Fourth, the state of economic knowledge among managers of farm units and in the agricultural economics profession is such that useful guidelines to essential adjustments in enterprise combination simply do not exist. Finally,

and of paramount importance to our discussion here today, the farm management profession could make highly significant contributions to the solution of such problems on Latin American farms.

The experience and competence of this profession in "putting together" a farm business to get the greatest mileage out of a farmer's bundle of resources, and in adjusting farm business organizations to changing conditions, would have a tremendously high payoff if appropriately applied to Latin American agriculture.

**Size of farm business.** Economic problems associated with farm enterprise and farm business size abound in Latin America. Such problems constitute a third major area in which the farm management profession could make meaningful contributions to agricultural development. This set of problems cuts across the spectrum from the small, subsistence, noncommercial farm operation to the huge, highly commercial, well-managed farm unit. There are a number of highly significant questions concerning efficiency of resource use, returns to factors of production, and income levels as related to farm and enterprise size. These problems tend to be associated, in part, with historical patterns of land acquisition and land holding. They are complicated by methods of transferring land and other agricultural resources from one generation to the next, land tenure arrangements, taxing structure, product and factor market structure as well as the economic-social-political phenomena of agrarian reform.

The future will likely bring major changes in such economically important things as size of ownership and operating unit. Given the current state of economic knowledge about size and scale relationships in agricultural production, most of these changes, whether "autonomous" or "induced," will be



made in virtual ignorance of their probable micro and macro economic consequences. Here, it would seem, systematic research by the farm management worker could provide valuable insights and guidelines for enterprise and business adjustments that would be consistent with criteria of efficient resource utilization.

**Managerial and decision processes.** One more problem area that would seem to have potential for highly useful and intriguing research by the farm management profession concerns the managerial function and the decision processes of Latin American farm owners and operators.

Important insights into ways to hasten the process of agricultural development could be obtained through systematic inquiry into the structure and nature of the managerial processes employed in the several strata of farm units. For example, virtually nothing is known about the nature of the goals and values that motivate the managers of Latin American farm businesses; the true seat of managerial and supervisory decisions is, at times, unclear; the relationship between information availability and needs in decision-making is a matter of speculation; strategies employed by managers in handling situations of risk and uncertainty are unknown. Knowledge of these and related phenomena would be of immense value not only in understanding the behavior of agriculture in these areas but also in developing educational and action programs designed to bring about change and development.

I have indicated four broad problem areas in Latin American agriculture that offer productive opportunities for farm management research. There are an infinite number of "pieces of research" within each of these areas. For practical purposes, each may be considered

virgin territory, untouched by the research implements of the farm management profession. There are undoubtedly other problem areas of importance that have likewise escaped exposure to objective and systematic investigation. There is no dearth of research opportunities with potentially high payoffs. The problem faced by our profession is not one of finding significant problems to study but rather one of deciding which of the many important problems to tackle first.

### **Allocation of Research Resources**

In considering the relationship of farm management research to agricultural development in areas such as Latin America another important issue needs to be raised. This deals with our state of knowledge about the agricultural development process and the allocation of scarce research resources between the study of this process, per se, and other perhaps less comprehensive lines of inquiry. It is safe to say that the nature of this process is not completely understood and that research resources allocated to its study will indeed be invested profitably.

It appears equally safe to assert that regardless of the true and complete nature of this process, a necessary although not sufficient condition to progress in agriculture is a preponderance of right decisions and actions by the managers of the primary producing units in the agricultural sector. Chances for improvement in the "batting average" of right decisions by managers of these entities can be bettered through the systematic investigation of real farm management problems and the subsequent dissemination of the findings of these studies to decision-makers. It follows that some rather substantial portion of the aggregate research resources devoted to agricultural development problems in Latin

America legitimately can be devoted to these ends. This is not the most glamorous of the alternative lines of inquiry. In Latin America, it is difficult work that will tax the best that our profession has to offer. At the same time, it is highly satisfying and rewarding work that is basic to increased rates of agricultural development in these areas.

At this point let us consider the appropriate role of the U.S. branch of the farm management profession in solving farm problems in Latin America. The magnitude of the farm management research tasks to be done clearly indicates the impracticability of the U.S. farm management profession assuming responsibility for the *direct solution* of these problems in their entirety. The professional people and other resources allocated to these tasks will be so limited that their direct efforts will make but a small dent in the morass of existing problems.

An alternative role, and a much more realistic one, is for the U.S. farm management profession to assume true leadership and major responsibility for assistance in the development of the personnel, research programs, and educational activities of indigenous Latin American institutions to the point where this branch of our profession can adequately cope with and solve, on a sustained basis, the farm management problems of their economy.

To play such a role successfully, the U.S. farm management profession will need to alter its current program in a number of ways. One of the more important of these alterations will be the development of substantive research programs on the *real* problems of Latin American agriculture. An important effect of such research programs will be a marked expansion of the range of problems over which our profession can speak with authority. Professional com-

petence in both conceptual and empirical matters will grow. Such research programs, if judiciously conceived and conducted, can make important, direct contributions to the solution of existing problems. However, if we are to make the most meaningful and lasting contribution to Latin American agriculture, these research programs must be conceived and organized in such a way that their *primary product* be a major contribution to the development of the farm management profession "south of the Rio Grande." Direct contributions to problem solution, and expansion of our professional knowledge and competence, will be important but of a lower order of significance than this "primary product."

### Organizing Our Efforts

This leaves open the important pragmatic question of how our branch of the profession might organize itself to play such a role most effectively. Although time does not permit tackling this question in depth, some brief comments might be helpful.

*First*, it appears obvious that we have not yet discovered the most appropriate way to organize our efforts toward this and parallel ends in the other agricultural sciences. A number of approaches have been or are being tried. We need to carefully appraise these and create imaginative new or modified approaches that will permit more rapid progress toward the specified end.

*Second*, regardless of the operational format eventually found to be most useful, a substantial number of U.S. farm management workers will need to become involved in and committed to long-run, active research programs in Latin America. Such involvement, if it is to be effective and meaningful, will necessitate major "investments" on the part of those members of our profession who accept this challenge. These investments will



take such forms as the time and effort to gain competence in the appropriate languages, to become "steeped" in the characteristics of the environment in which farm management problems arise, to learn how to cope with the mechanics of research in situations quite different than those to which most of us have grown accustomed, and to modify, as needed, our conceptual research models so that they fit the real problems of concern.

*Third*, it is quite probable that the efforts of the farm management profession in this sphere can be most effective only if integrated with similar efforts by our colleagues in other fields of agricultural economics, the physical and biological sciences of agriculture and, perhaps, the parent sciences as well.

*Fourth*, in addition to the commitments by individual agricultural sci-

entists, the U.S. institutions that they represent will need to commit themselves, without reservation, to this work and make whatever organizational and administrative changes necessary to support fully the activities of the professional worker. It is obvious that the nature of this task is such that both individual and institutional commitments must be of the long-run variety.

In closing let me say that the issues being discussed here today constitute a major challenge to our profession. This could very well be the major challenge facing this generation of farm management workers. The problems involved in meeting this challenge are many. But as our profession has identified, accepted, and successfully met other important and difficult challenges in the past, I am certain that it will find a way to do likewise in this situation.

## International Trade Models

T. TAKAYAMA and G. G. JUDGE

Department of Agricultural Economics, University of Illinois

**T**HE IMPACT AND IMPLICATIONS of international trade on the economic development of a country or group of countries has concerned economists over a long period of time. This concern takes on added significance today since the tendency of some groups of countries toward some form of economic integration is very evident. This tendency is strongest in Western Europe, although a start toward regional integration has been made in Central and Latin America and the Arab nations.

What information do these countries, and others who are tending toward some form of economic integration, have regarding the impact of such integration in each country on (1) the accumulation of capital in new forms, (2) the technical

conditions of production, (3) the profile of consumption and (4) the levels of imports and exports? In most cases information concerning probable impacts is scanty, and the direction and magnitude of the consequences of certain changes under which trade takes place is uncertain. However, knowledge of this nature is a prerequisite to framing intelligent courses of action to make the role of trade effective in economic development.

Given the necessity of information for decision-making, the question arises as to the strategy for capturing this knowledge. Within this context, economic models provide one basis for drawing certain conclusions regarding the outcome of the interaction of economic

variables as well as providing a framework under which empirical analyses may proceed. Since the time Ricardo outlined a simple theory to explain the actual patterns of international trade and proclaim its benefits to those participating, the construction of models of world production and trade has been a stimulating challenge to economists. To a large extent the classical models were limited to a two-country, two-commodity, two-factors-of-production world.

Recognizing the inadequacy of the classical analysis with its bilateral comparisons, Graham [6]\* constructed general equilibrium models of world production and trade with many countries and many commodities which he solved by trial and error to find the points of competitive equilibrium. The works of Yntema [22], Mosak [12], Ohlin [13], and Samuelson [14] are also examples of other contributions to the development of general formulations for international economics. McKenzie [11] used the activity analysis model of production and allocation developed by Koopmans [8], Dantzig [3], and others to present proof of the efficiency of competition and free trade in Graham's formulation and to indicate the applicability of activity analysis to the theory of international trade. In a recent article Uzawa [20] uses a general equilibrium trade model to derive certain conclusions regarding the effect of international trade on the prices of factors of production.

Parallel to the development of general models in international economics there have also been several contributions in the area of interregional trade. Because of the large degree of similarity between regional and international economics the works of Enke [4], Samuelson [15], Koopmans [7], Beckmann and Mar-

schak [2], Lefebvre [10], and Stevens [17] are particularly relevant.

Given the contributions of the classical and modern precursors the modest purpose of this paper is to suggest two alternative short-run equilibrium models which may be used as a basis for analyzing world production and trade. Each model contains the interrelations among many countries with competitive economies.

The first model will be concerned with an activity analysis specification of international trade, with the modification that the demands for final commodities in each of the countries are represented by price-dependent linear functions [18]. A world "welfare function" is defined, and a programming formulation is specified that can be used to maximize the "world welfare function" subject to the restrictions of the model.

In the second model demands and supplies of all commodities in each of the countries are represented as linear functions of price. The Samuelson [15] concept of "net social payoff" is then used to specify a "world welfare function" and a quadratic programming model is specified.

For each of the models a computational algorithm is presented by which one can obtain directly and efficiently the optimum competitive price and allocation solutions. Examples are given to reflect the structure of the programming problems. The paper concludes with some remarks concerning the potential research applications of these models in gauging the economic impacts of alternative trade or integration systems.

### **Model I — The Activity Analysis General Equilibrium Model**

In developing the first model the following definitions, notation, and restrictive and expository assumptions are employed: The world economy can

\* This number and similar numbers in brackets refer to "Literature Cited" on pages 62 and 63.



be partitioned into  $I$  countries. An individual country is designated by  $i, j$  with  $i, j = 1, 2, \dots, I$ . Competitive behavior is stipulated for all participating countries and all commodities are traded in competitive markets. The commodity space for each country is composed of  $\mu$  commodities with  $\mu = 1, 2, \dots, N$ . Let  $\nu$  be a subset of this commodity space where  $\nu = K+1, K+2, \dots, N$ .

These commodities are partitioned as follows:  $k$  final commodities where  $k = 1, 2, \dots, K$ ;  $l$  intermediate commodities, where  $l = K+1, K+2, \dots, L$ ;  $m$  mobile primary commodities where  $m = L+1, L+2, \dots, M$ ;  $n$  immobile primary commodities where  $n = M+1, M+2, \dots, N$ . All commodities except immobile primary commodities are assumed to be transportable between countries. Thus each country can supply her requirements of the mobile commodities from domestic sources and from other countries. The native availability of intermediate and primary commodities (amount available before importing) in a country is assumed known and limited. Let these quantities be denoted by  $S^\mu = (s_i^\mu) \geq 0$  where  $\mu = K+1, K+2, \dots, N$ . Let the net availability of commodity  $\mu$  in the  $i$ th country (the amount remaining after exports and imports) be denoted by  $E^\mu = (e_i^\mu) \geq 0$  where  $\mu = K+1, K+2, \dots, N$ .

Within each country production is assumed technologically uniform. The set of producing processes may differ among countries. Inputs and outputs of every production process in each country are assumed in constant proportion for all levels at which the process is operated. Let  $\theta^\mu$  denote the producing and flow processes available for the  $\mu$ th commodity;  $\mu = 1, 2, \dots, M$ . Let  $a_i^{\nu\theta^\mu}$  denote the input required or the  $\mu$ th output emerging per unit of

process  $\theta^\mu$  in the  $i$ th country. Let  $X^{\theta^\mu} = (x_{ij}^{\theta^\mu}) \geq 0$  denote the level of process  $\theta^\mu$  that is to flow from country  $i$  to country  $j$ ;  $\mu = 1, 2, \dots, M$ . Let  $Y^k = (y_i^k)$  denote the quantity of the  $k$ th product consumed in the  $i$ th country.

It is assumed that transportation is needed for the international movement of commodities and the transportation costs are known for each commodity and each pair of countries. Further it is assumed that commodities within each country do not need transportation or that the intracountry movement is carried on at a zero transport cost. Let  $T^{\theta^\mu} = (t_{ij}^{\theta^\mu}) \geq 0$  denote the unit transport cost for transporting the  $\mu$ th commodity produced by process  $\theta^\mu$  from country  $i$  to  $j$ ,  $\mu = 1, 2, \dots, M$ . Let  $P^\mu = (P_i^\mu) \geq 0$  denote the demand price of the  $\mu$ th commodity in the  $i$ th country,  $\mu = 1, 2, \dots, N$ . Exchange rates between countries,  $\rho_i$ , are assumed known and are used to convert the prices and transport costs to a common currency basis.

Each country's domestic demand for final commodities is assumed given as a known linear price-dependent function. Let  $D^k = (d_i^k) = (y_i^k) \geq 0$  denote the demand relations for the  $k$ th commodity in the  $i$ th country for all  $k$  and  $i$  such that

$$(1) \quad d_i^k = y_i^k = \alpha_i^k - \sum_h \beta_i^{hk} p_i^h$$

where  $\alpha_i^k, \beta_i^{hk} > 0$  for  $h = k$  and  $\beta_i^{hk}$  otherwise unrestricted. Alternatively the inverse of (1) is

$$(1a) \quad p_i^k = \lambda_i^k - \sum_h \omega_i^{hk} y_i^h$$

where the  $\beta$  and  $\omega$  matrices are assumed symmetric and positive definite and  $\lambda_i^k$  is strictly positive.

Given the above definitions, assumptions, and notation we propose to define our problem in the following "quasi-

welfare" sense: Given the linear domestic demand relations for final products in all countries, the production processes, the primary commodity endowments, and the transport costs for all mobile commodities, we wish to find that price and allocation program that will maximize net consumer gain. Net consumer gain is defined as the summation of the integral of the individual country's demand relations minus the total cost incurred in shipping the final intermediate and mobile primary commodities between countries.

In mathematical form the problem may be stated as:

Problem I

To maximize

$$\begin{aligned}
 (2) \quad f(Y, X) &= \sum_i \int_0^{y_i^k} \sum_k (\lambda_i^k - \sum_h \omega_i^{hk} y_i^h) dy_i^k \\
 &\quad - \sum_\mu \sum_{\theta^\mu} \sum_i \sum_j t_{ij}^{\theta^\mu} x_{ij}^{\theta^\mu} \\
 (3) \quad &= \sum_i \left( \sum_k \lambda_i^k y_i^k \right. \\
 &\quad \left. - \frac{1}{2} \sum_k \left( \sum_h \omega_i^{hk} y_i^h \right) y_i^k \right) \\
 &\quad - \sum_\mu \sum_{\theta^\mu} \sum_i \sum_j t_{ij}^{\theta^\mu} x_{ij}^{\theta^\mu} \\
 &= \sum_i \left( \lambda_i' y_i - \frac{1}{2} y_i' \omega_i y_i \right) \\
 &\quad - \sum_\mu \sum_{\theta^\mu} \sum_i \sum_j t_{ij}^{\theta^\mu} x_{ij}^{\theta^\mu}
 \end{aligned}$$

subject to

$$(4) \quad e_i^k = s_i^k + \sum_{\theta^k} \sum_j x_{ij}^{\theta^k} - y_i^k \leq 0$$

$$\begin{aligned}
 (5) \quad e_i^1 &= s_i^1 + \sum_j \sum_{\theta^1} x_{ji}^{\theta^1} \\
 &\quad - \sum_k \sum_j \sum_{\theta^k} a_j^{1\theta^k} x_{ij}^{\theta^k} \geq 0
 \end{aligned}$$

$$\begin{aligned}
 (6) \quad e_i^m &= s_i^m + \sum_j \sum_{\theta^m} (x_{ji}^{\theta^m} - x_{ij}^{\theta^m}) \\
 &\quad - \sum_j \sum_{\theta^k} a_i^{m\theta^k} x_{ji}^{\theta^k} \\
 &\quad - \sum_j \sum_{\theta^1} a_i^{m\theta^1} x_{ji}^{\theta^1} \geq 0
 \end{aligned}$$

$$\begin{aligned}
 (7) \quad e_i^n &= s_i^n - \sum_j \sum_{\theta^k} a_i^{n\theta^k} x_{ji}^{\theta^k} \\
 &\quad - \sum_j \sum_{\theta^k} a_i^{n\theta^1} x_{ji}^{\theta^1} \geq 0
 \end{aligned}$$

$$(8) \quad y_i^k, x_{ij}^{\theta^\mu} \geq 0$$

In matrix form, these constraints are expressed as follows:

$$\begin{aligned}
 (9) \quad &\begin{bmatrix} I^k & -G^{\theta^k} & & \\ & A^{1\theta^k} & -G^{\theta^1} & \\ & A^{m\theta^k} & A^{m\theta^1} & -G^{\theta^m} \\ & A^{n\theta^k} & A^{n\theta^1} & \end{bmatrix} \begin{bmatrix} Y^k \\ X^{\theta^k} \\ X^{\theta^1} \\ X^{\theta^m} \end{bmatrix} \\
 &\leq \begin{bmatrix} S^k \\ S^1 \\ S^m \\ S^n \end{bmatrix}
 \end{aligned}$$

and

$$(10) \quad Y^k, X^{\theta^\mu} \geq 0$$

Given this formulation in order to derive the necessary conditions for the maximum net consumer gain we form the following Lagrangean:

$$\begin{aligned}
 (11) \quad \phi(Y, X, P) &= f(Y, X) + P^{\mu'} e^\mu \\
 &= f(Y, X) + P^{k'} e_i^k \\
 &\quad + P^{1'} e^1 + P^{m'} e^m \\
 &\quad + P^{n'} e^n
 \end{aligned}$$

$$(12) \quad \text{for } P^\mu, X, Y \geq 0$$

The necessary conditions for the maximum of (11) subject to (12) are given by the direct application of the Kuhn-Tucker optimality conditions [9], as follows:

$$\begin{aligned}
 (13) \quad \frac{\partial \phi}{\partial \bar{y}_i^k} &= \left( \lambda_i^k - \sum_h \omega_i^{hk} \bar{y}_i^h \right) \\
 &\quad - \bar{P}_i^k \leq 0 \text{ and } \left( \frac{\partial \phi}{\partial \bar{y}_i^k} \right) \cdot \bar{y}_i^k = 0
 \end{aligned}$$

$$\begin{aligned}
 (14) \quad \frac{\partial \phi}{\partial \bar{x}_{ij}^{\theta^k}} &= \bar{p}_j^k - \sum_\mu \bar{p}_i^\mu a_i^{\mu\theta^k} - t_{ij}^{\theta^k} \\
 &\leq 0 \text{ and } \frac{\partial \phi}{\partial \bar{x}_{ij}^{\theta^k}} \cdot \bar{x}_{ij}^{\theta^k} \\
 &= 0 \quad \text{for } \mu = 1, m, n
 \end{aligned}$$



$$(15) \quad \frac{\partial \phi}{\partial \bar{x}_{ij}^{\theta^1}} = \bar{p}_j^1 - \sum_{\mu} \bar{p}_i^{\mu} a_{i^{\mu} \theta^1} - t_{ij}^{\theta^1} \\ \leq 0 \text{ and } \frac{\partial \phi}{\partial \bar{x}_{ij}^{\theta^1}} \cdot \bar{x}_{ij}^{\theta^1} \\ = 0 \quad \text{for } \mu = m, n$$

$$(16) \quad \frac{\partial \phi}{\partial \bar{x}_{ij}^{\theta^m}} = \bar{p}_j^m - \bar{p}_i^m - t_{ij}^{\theta^m} \\ \leq 0 \text{ and } \frac{\partial \phi}{\partial \bar{x}_{ij}^{\theta^m}} \cdot \bar{x}_{ij}^{\theta^m} = 0$$

$$(17) \quad \frac{\partial \phi}{\partial \bar{p}_i^{\mu}} = \bar{e}_i^{\mu} \geq 0 \text{ and } \frac{\partial \phi}{\partial \bar{p}_i^{\mu}} \cdot \bar{p}_i^{\mu} \\ = 0 \quad \text{for } \mu = 1, m, n$$

and

$$(18) \quad \bar{P}^{\mu}, \bar{X}^{\theta^{\mu}}, \bar{Y}^k \geq 0$$

The conditions (13) through (17) may be expressed in matrix form as follows:

$$(19) \quad \begin{bmatrix} I^k & & & \\ -G^{\theta^{k'}} & A^{1\theta^{k'}} & A^{m\theta^{k'}} & A^{n\theta^{k'}} \\ & -G^{\theta^{1'}} & A^{m\theta^{1'}} & A^{n\theta^{1'}} \\ & & -G^{\theta^{m'}} & A^{n\theta^{m'}} \end{bmatrix} \begin{bmatrix} \bar{P}^k \\ \bar{P}^1 \\ \bar{P}^m \\ \bar{P}^n \end{bmatrix} \\ - \begin{bmatrix} \lambda_i - \omega_i \bar{Y}^k \\ T^{\theta^k} \\ T^{\theta^1} \\ T^{\theta^m} \end{bmatrix} \geq 0$$

or

$$(19a) \quad A' \bar{P}^{\mu} - \begin{bmatrix} \lambda - \omega \bar{Y}^k \\ T^{\theta^{\mu}} \end{bmatrix} \geq 0$$

$$(20) \quad \bar{X}^{\theta^{\mu}'} \left( A' \bar{P}^{\mu} - \begin{bmatrix} \lambda - \omega \bar{Y}^k \\ T^{\theta^{\mu}} \end{bmatrix} \right) = 0$$

and

$$(21) \quad \bar{P}^{\mu}, \bar{Y}^k, \bar{X}^{\theta^{\mu}} \geq 0$$

The above conditions, (13) through (17) or (19) and (20), spell out the zero profit equilibrium conditions. Under this system prices are such that profits on all production processes actually used are zero, and no process may permit a positive profit. Profits for all

shipments of final, intermediate, and mobile primary commodities must be zero. Therefore, the prices of all mobile commodities in two different countries can differ at most by the unit cost of transportation. Transportation cost equals this price difference whenever positive flows take place. Rents on immobile resources exceed zero only if the resource or capacity is fully used.

Given the quadratic net consumer gain function that is to be maximized subject to a set of linear constraints, by making use of a theorem for reducing nonlinear programming problems to linear programming problems and the duality theorem of linear programming, the primal and dual programming specifications for the model are:

Primal problem

To maximize

$$(22) \quad [(\lambda - \omega \bar{Y}^k)', -T^{\theta^{\mu}'}] \begin{bmatrix} y^k \\ X^{\theta^{\mu}} \end{bmatrix}$$

subject to (4) through (8)

Dual problem

To minimize

$$(23) \quad S^{\mu'} P^{\mu}$$

subject to

$$(24) \quad A' P^{\mu} = [(\lambda - \omega \bar{Y}^k)', -T^{\theta^{\mu}'}]$$

and

$$(25) \quad P^{\mu} \geq 0$$

Under this specification the joint primal-dual programming formulation is this:

To maximize

$$(26) \quad [(\lambda - \omega y^k)', -T^{\theta^{\mu}'}] \begin{bmatrix} y^k \\ X^{\theta^{\mu}} \end{bmatrix} - S^{\mu'} P^{\mu} \leq 0$$

subject to

$$(27) \quad A[y^{k'}, X^{\theta^{k'}}, X^{\theta^{1'}}, X^{\theta^{m'}}] + W^{\mu} = S^{\mu}$$

Table 1. — International Activity Analysis Spatial Equilibrium Tableau

	P <sub>o</sub>	P <sup>k</sup>	P <sup>l</sup>	P <sup>m</sup>	P <sup>n</sup>	Y <sup>k</sup>	X <sup>θ<sup>k</sup></sup>	X <sup>θ<sup>l</sup></sup>	X <sup>θ<sup>m</sup></sup>	W <sup>k</sup>	W <sup>l</sup>	W <sup>m</sup>	W <sup>n</sup>	V <sup>k</sup>	V <sup>θ<sup>k</sup></sup>	V <sup>θ<sup>l</sup></sup>	V <sup>θ<sup>m</sup></sup>
0	W <sup>k</sup>	S <sup>k</sup>				I	-G <sup>θ<sup>k</sup></sup>			I							
0	W <sup>l</sup>	S <sup>l</sup>					A <sup>lθ<sup>k</sup></sup>	-G <sup>θ<sup>l</sup></sup>			I						
0	W <sup>m</sup>	S <sup>m</sup>					A <sup>mθ<sup>k</sup></sup>	A <sup>mθ<sup>l</sup></sup>	-G <sup>θ<sup>m</sup></sup>			I					
0	W <sup>n</sup>	S <sup>n</sup>					A <sup>nθ<sup>k</sup></sup>	A <sup>nθ<sup>l</sup></sup>					I				
-M	Z <sup>k</sup>	λ	I											-I			
0	V <sup>θ<sup>k</sup></sup>	0	-G <sup>θ<sup>k</sup>'</sup>	A <sup>lθ<sup>k</sup>'</sup>	A <sup>mθ<sup>k</sup>'</sup>	A <sup>nθ<sup>k</sup>'</sup>	ω								-I		
0	V <sup>θ<sup>l</sup></sup>	0		-G <sup>θ<sup>l</sup>'</sup>	A <sup>mθ<sup>l</sup>'</sup>	A <sup>nθ<sup>l</sup>'</sup>										-I	
0	V <sup>θ<sup>m</sup></sup>	0			-G <sup>θ<sup>m</sup>'</sup>												-I

(28)  $A'P^\mu - [V^{k'}, V^{\theta^{k'}}, V^{\theta^{l'}}, V^{\theta^{m'}}]'$   
 $= [(\lambda - \omega y^k)', -T^{\theta^\mu}']'$

and

(29)  $Y^k, X^{\theta^\mu}, P^\mu, W^\mu, V^k, V^{\theta^\mu} \geq 0$

where  $W^\mu, V^k$  and  $V^{\theta^\mu}$  are slack variables.

If this problem is solvable, then (2) assumes its maximum, and

(30)  $[(\lambda - \omega \bar{y}^k)', -T^{\theta^\mu}] \begin{bmatrix} \bar{y}^k \\ \bar{X}^{\theta^\mu} \end{bmatrix} - S^\mu \bar{P}^\mu = 0$

or

(31)  $(\lambda - \omega \bar{y}^k)' \bar{y}^k = S^\mu \bar{P}^\mu + T^{\theta^\mu} \bar{X}^{\theta^\mu}$

(30) and (31) may be referred to as the balance of payment condition over all countries and the interpretation is that in equilibrium the total revenue from the sale of final commodities is completely exhausted by the cost of producing the bundle of final commodities (returns to resource owners) plus the transportation costs for the optimal flows of mobile commodities. The optimum solution to the problem will satisfy the equilibrium conditions, (13) through (18), and departures from this equilibrium will decrease both the total net consumer gain to world consumers of final commodities and the total returns to resource owners.

The formulation given in equations (26) through (29) leads to the Wolfe [5, 21], and the Dorfman and Barankin [1] algorithm for quadratic programming. The characteristics of the programming tableau for the international

pricing and allocation model are shown in Table 1. In the table the I's represent identity matrices and M is any positive real number.  $Z^k$  is an initial basic slack variable to be driven out in the course of the analysis. A more complete treatment of this type of model is presented in [18].

Model II — The Linear Demand and Supply Relation Model

In this model we consider n countries that produce and consume m products. Let i, j denote the countries when i, j = 1, 2, . . . , n and let h, k represent the commodity space where h, k = 1, 2, . . . , m. Assume that domestic demand and supply relations for each country and each commodity can be specified as linear functions. In this connection let  $p_i^k$  and  $p^{jk}$ , with  $P = (p_i^k, p^{jk})$ , denote the demand and supply prices in country i for the kth product on a common currency basis. Let  $d_i^k$  denote the linear demand relations for the k products in country i. Then  $d_i^k = \alpha_i^k - \sum_{h=1}^m \beta_i^{hk} p_i^h$ , where  $\alpha_i^k \geq 0, \beta_i^{hk} \geq 0$  for  $h = k, \beta_i^{hk} \leq 0$  for  $h \neq k$  for  $i = 1, 2, . . . , n$  and  $h, k = 1, 2, . . . , m$ . Let  $s_j^k$  denote the linear regional supply relations for the kth product in region j. Then  $s_j^k = \theta_j^k + \sum_{h=1}^m \gamma_j^{hk} p^{jh}$  where  $\theta_j^k \geq 0, \gamma_j^{hk} \geq 0$  for  $h = k, \gamma_j^{hk} \leq 0$  for  $h \neq k$  for  $j = 1, 2, . . . , n$  and



$h, k = 1, 2, \dots, m$ . Let  $X = (x_{ij}^k)$  denote the flows of commodity  $k$  from country  $i$  to country  $j$ . Let  $T = (t_{ij}^k)$  denote the unit transportation costs for shipping the  $k$ th commodity from country  $i$  to country  $j$ .

Given these definitions and assumptions the Samuelson [15] concept of net social payoff will be employed as a basis for specifying the objective or world welfare function.<sup>1</sup> Social payoff for a given commodity and country is defined as the algebraic area under the excess demand relation [15]. Net social payoff for all countries and products is defined as the sum of the  $nk$  separate payoffs minus the total transport cost of all shipments. Within this specification the problem is to find that set of prices, demands, supplies, and intercountry flows which will make net social payoff a maximum.

For the  $n$  country,  $m$  product case with domestic demand and supply relations for each country specified as linear functions, the Samuelson's net social payoff — in this case, net world payoff — may be written as:<sup>2</sup>

$$\begin{aligned}
 (32) \quad \text{NWP} &= f(X) \\
 &= \sum_i \sum_k \lambda_i^k \sum_j x_{ij}^k \\
 &\quad - \frac{1}{2} \sum_i \sum_k \left( \omega_i^{hk} \sum_j x_{ij}^h \right) \sum_j x_{ij}^k \\
 &\quad - \sum_i \sum_k \mu_i^k \sum_j x_{ji}^k \\
 &\quad - \frac{1}{2} \sum_i \sum_k \left( \eta_i^{hk} \sum_j x_{ji}^h \right) \sum_j x_{ji}^k \\
 &\quad - \sum_i a_i^k - \sum_i \sum_k \sum_j t_{ij}^k x_{ij}^k
 \end{aligned}$$

where  $\lambda_i^k = (\beta^{-1}\alpha)_i^k$ ,  $\omega_i^{hk} = (\beta^{-1})_i^{hk}$ ,  $\mu_i^k = -(\gamma^{-1}\theta)_i^k$ ,  $\eta_i^{hk} = (\gamma^{-1})_i^{hk}$  for all  $i, j, h$ ,

and  $k$  and  $a_i$  is the producers' and consumers' surplus in the  $i$ th country under pre-trade equilibrium.

Our problem is to maximize (32) subject to

$$(33) \quad x_{ij}^k \geq 0 \text{ for all } i, j, \text{ and } k$$

Necessary conditions for  $f(X)$  to be a maximum are as follows:<sup>3</sup>

$$\begin{aligned}
 (34) \quad \frac{\partial f(X)}{\partial \bar{x}_{ij}^k} &= \lambda_j^k - \sum_h \omega_j^{hk} \sum_i \bar{x}_{ij}^h - \mu_i^k \\
 &\quad - \sum_h \eta_i^{hk} \sum_j \bar{x}_{ji}^h - t_{ij}^k \leq 0
 \end{aligned}$$

and

$$(35) \quad \frac{\partial f(X)}{\partial \bar{x}_{ij}^k} \cdot \bar{x}_{ij}^k = 0.$$

Since

$$(36) \quad \lambda_i^k - \sum_h \omega_i^{hk} \sum_j x_{ij}^h = p_i^k \geq 0$$

and

$$(37) \quad \mu_j^k - \sum_h \eta_j^{hk} \sum_i x_{ji}^h = p^j \geq 0$$

we can also write these conditions as

$$\begin{aligned}
 (38) \quad \bar{p}_i^k - \bar{p}^k &\leq t_{ij}^k \quad \text{and} \\
 (\bar{p}_i^k - \bar{p}^k - t_{ij}^k) \bar{x}_{ij}^k &= 0
 \end{aligned}$$

The economic interpretation of these maximum or equilibrium conditions is that the difference in prices of one product between any two countries can differ at most by the unit cost of transportation and in equilibrium for those countries between which flows take place  $\bar{p}_j^k - \bar{p}_i^k = t_{ij}^k$ . For the countries where  $\bar{p}_i^k - \bar{p}^k < t_{ij}^k$  no flows take place, i.e.,  $\bar{x}_{ij}^k = 0$ . These price conditions are recognized as being consistent with those resulting from competitive behavior and the uncoordinated efforts of the  $nk$  suppliers to sell their products at the maximum possible prices.

The equivalent programming formulation in the domain of  $P$  of the above

<sup>1</sup> For an alternative criterion that may be used in specifying the objective function see Smith [16].

<sup>2</sup> For a more complete development of this formulation see Takayama and Judge [19].

<sup>3</sup> The derivation of the following conditions is performed by setting up the Lagrangean  $\phi(X, V) = f(X) + V'X$  and applying the Kuhn-Tucker conditions [9] in the same way as in Model I.

problem may be given as follows:

To maximize

$$\begin{aligned}
 F(P) &= \sum_i \sum_k \alpha_i^k p_i^k \\
 &\quad - \frac{1}{2} \sum_i \sum_k \left( \sum_h \beta_i^{hk} p_i^h \right) p_i^k \\
 &\quad - \sum_i \sum_k \theta_i^k p_i^k \\
 &\quad - \frac{1}{2} \sum_i \sum_k \left( \sum_h \gamma_i^{hk} p_i^h \right) p_i^k \\
 (39) \quad &= C'P - \frac{1}{2} P'QP
 \end{aligned}$$

subject to

$$(40) \quad G'P \leq T$$

and

$$(41) \quad P \geq 0$$

where

$$(42) \quad C = (C^k) = (\alpha_i^k - \theta_i^k)$$

$$(43) \quad G = \begin{bmatrix} G^1 & & & \\ & G^2 & & \\ & & \ddots & \\ & & & G^m \end{bmatrix}; (2mn) \times (2mn)$$

where

$$(44) \quad G^i = \begin{bmatrix} 1 & & & & & \\ & 1 & & & & \\ & & \ddots & & & \\ & & & 1 & & \\ & & & & \ddots & \\ & & & & & 1 \end{bmatrix}; (2n \times n^2)$$

$$\begin{aligned}
 (45) \quad Q &= \begin{bmatrix} \beta_i^{11} & \beta_i^{21} & \cdots & \beta_i^{m1} \\ \gamma_i^{11} & \gamma_i^{21} & \cdots & \gamma_i^{m1} \\ \beta_i^{12} & \beta_i^{22} & \cdots & \beta_i^{m2} \\ \gamma_i^{12} & \gamma_i^{22} & \cdots & \gamma_i^{m2} \\ \vdots & \vdots & \ddots & \vdots \\ \beta_i^{1m} & \beta_i^{2m} & \cdots & \beta_i^{mm} \\ \gamma_i^{1m} & \gamma_i^{2m} & \cdots & \gamma_i^{mm} \end{bmatrix}; \\
 &(2mn \times 2mn)
 \end{aligned}$$

where

$$(46) \quad \beta_i^{hk} = \begin{bmatrix} \beta_1^{hk} & & & \\ & \beta_2^{hk} & & \\ & & \ddots & \\ & & & \beta_n^{hk} \end{bmatrix}; (n \times n)$$

$$(47) \quad \gamma_i^{hk} = \begin{bmatrix} \gamma_1^{hk} & & & \\ & \gamma_2^{hk} & & \\ & & \ddots & \\ & & & \gamma_n^{hk} \end{bmatrix}; (n \times n)$$

Proceeding as in the previous model the primal-dual programming formulation is:

To maximize

$$\begin{aligned}
 (48) \quad g(P, X) &= [C - QP]' P - T'X \\
 &= -V'X \leq 0
 \end{aligned}$$

subject to

$$(49) \quad G'P + V = T$$

$$(50) \quad GX = C - QP$$

or

$$(51) \quad GX + QP = C$$

and

$$(52) \quad X, P, V \geq 0$$

where

$$(53) \quad X = (x_{11}^1, x_{12}^1, \dots, x_{nn}^m)'$$

$$(54) \quad V = (v_{11}^1, v_{12}^1, \dots, v_{nn}^m)'$$

Again this formulation leads to the Wolfe, Dorfman and Barankin algorithm for quadratic programming. The tableau, Table 2, shows the characteristics of the algorithm for this problem. By investigating the identity of (38), (48), and (49); (36), (37), and (50) or (51); and (34), (36), (37), and (52), we establish the equivalence of two formulations.





could be altered to accommodate other types of market behavior. Tariffs and trade agreements between countries have been omitted from the models. In the real world, of course, each of these devices exists and is important in determining the patterns of international trade. Each of these considerations can be handled in the model by introducing additional restrictions. For example, a tariff between two countries might be considered as an addition to the transport cost, and a trade agreement affecting the flow of a commodity between two countries could be handled by adding an additional restriction. An export subsidy could be handled as a negative tariff. Stocks of a final or intermediate commodity in a country could also be incorporated in the models.

In the models proposed the exchange rate  $p_i$  was taken as given. Unless by some lucky quirk of fate  $p_i$  is the optimum exchange rate the income-expenditure situation for each country may not balance. In order to bring about a balance of payments for each country, and thus a *competitive* equilibrium solution [20], some mechanism would have to be devised to obtain or determine the optimum exchange rate. As the models now stand they do indicate the degree of discrepancy in the balance of payments that one might expect under given exchange rates and technical conditions.

The models as proposed are structured for short-run analyses. Long-run analyses could be specified by relaxing the restrictions on some immobile primary commodities (for example, labor). In addition, since problems over time have many of the characteristics of problems over space, an international-intertemporal model could be specified.

From a computational standpoint the algorithms proposed for the models offer an efficient method for computing the

equilibrium solutions. Since the algorithm can be used with either a quadratic or modified linear programming routine the method should be within the computing resources of many researchers. We believe the empirical counterparts of models such as these are necessary if we are to develop an adequate strategy for making the role of trade effective in economic development.

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## Trade Liberalization: Issues and Implications

STEPHEN C. SCHMIDT

Department of Agricultural Economics, University of Illinois

**P**ROTECTIONIST IMPORT POLICIES limit competition, violate the principle of comparative advantage, and impede progress toward international specialization in agricultural products. Concerted action is sought to moderate the protective features of domestic agricultural policies and obtain arrangements that regularize and stabilize trade.

Efforts for the achievement of this objective are underway now through the forum provided by the U.N. Conference on Trade and Development and the "Kennedy Round" of negotiations sponsored by GATT (General Agreement on Tariffs and Trade) which began on May 4, 1964. Opinion is growing that imports from temperate-zone producers should be assured access to traditional markets at some recent levels of these imports within the framework of worldwide commodity agreements.

The United States is especially inter-

ested in working out such market access arrangements for food and feed grains, oils and fats, and certain livestock products. A similar approach is considered suitable for dealing with the problems of noncompeting tropical products supplied mainly by underdeveloped nations. To many nations in Asia and Latin America, which are confronted with recurring inflationary pressures, balance of payments problems, and food shortages, access to export markets represents an indispensable element. For economic development this is as important as the ability to obtain foreign capital and managerial and technical skills.

On the whole, however, the internal and external commercial policies of industrial countries are not conducive to a more rapid and self-sustained economic development of the less advanced countries. In this regard the possibilities of enlarging the demand for the products of

the less-developed nations through the liberalization of nontariff barriers received considerable attention. This led to the suggestion of broadening the range of negotiable trade barriers under GATT with special reference to internal fiscal charges and quantitative restrictions.

Although there is undoubtedly considerable scope for expanding U.S. exports, it is open to question whether, with the emergence of regional trading blocks, they can be maintained in the future. It is the major objective of this paper to (1) describe the principal economic and institutional forces that affect the level and pattern of trade in temperate and tropical zone foods and raw materials, and (2) underline the urgency of the need for studies that encompass the current and contemplated domestic policies of industrial countries as they affect international trade and studies that lead to the formulation of intergovernmental arrangements that promote continued growth in trade and in the economic development of primary exporting countries.

### Position of Export Countries

The main concern of export countries, whether temperate or tropical, is to find means that ensure continued access to traditional markets together with a share in their growth. Efforts toward the achievement of this objective received official endorsement and support with the inception of the GATT program for liberalization and expansion of world trade approved at a meeting of ministers in November 1958.

The implementation of action programs was assigned to three committees. Specifically, the principal responsibility of Committee I was to promote trade by abolishing or reducing customs duties. The work of this Committee culminated in the Geneva 1960-61 Tariff Confer-

ence.<sup>1</sup> The function of Committee II was to deal with nontariff measures and policies inhibiting international agricultural trade.<sup>2</sup> Committee III considered the expansion of export earnings of less-developed countries, and questions confronting diversification of their economies.<sup>3</sup>

All things considered, much importance is attached to the development and pursuit of policies and programs that (1) are consistent with the aim of facilitating the development and diversification of the economies of the undeveloped countries, (2) moderate the degree of protection extended to competing temperate zone commodities as well as manufactures exported by undeveloped countries, and (3) reduce import duties, internal fiscal charges, and other obstacles to the growth of trade in noncompeting primary commodities.

The successful realization of this objective will hinge, *inter alia*, upon the sincerity and willingness of governments to submit disputes and conflicts of interest that might arise to international conciliation and if necessary arbitration. Opportunity to test the receptivity of various governments toward seeking such negotiated settlements is being provided by two international forums: the first U.N. Conference on Trade and Development convened under the aegis of U.N.'s Economic and Social Council, and the "Kennedy Round" of negotiations conducted under GATT auspices.

<sup>1</sup>For an itemized list of reciprocal tariff concessions made at this conference, see "Protocol to the General Agreement on Tariffs and Trade Embodying Results of the 1960-61 Tariff Conference," Treaties and Other International Acts Series 5253. U.S. Dept. State, 1963.

<sup>2</sup>For an elaboration on the conclusions reached by Committee II, see "Trade in Agricultural Products," 2nd and 3rd Rpts. Committee II. GATT, Geneva. 1962.

<sup>3</sup>For a discussion of the principal findings and recommendations of Committee III, see "Trade of Less-Developed Countries," Spec. Rpt. Committee III. GATT, Geneva. 1962.



### Countries Exporting Primary Commodities

An indication of the nature of problems encountered by this group of countries may be gained from a review of the longterm trends in the level and pattern of their trade transacted with the industrially advanced countries. The distinctive features of this trade were (1) the exchange of primary commodities for manufactures,<sup>4</sup> (2) disparity between the export supply and import demand for primary commodities, (3) marked short period instability of primary commodity prices, (4) deterioration in the terms of exchange between primary commodities and manufactures, and (5) divergence in trends between foreign demand for exports of the primary producing countries and their demand for imports.

The relatively slow growth in trade of primary commodities can be attributed to an important degree to the structural changes in demand that are taking place in the major importing countries. These changes include a shift in consumer preferences towards more highly processed products and technological advances that give rise both to economies in raw material use and to the creation of synthetic substitutes. In this context it should be emphasized that cotton, jute, silk, and sisal are encountering growing competition from man-made fibers. Likewise, since the late 1950's competition has been intensified between natural and synthetic rubber with the latter accounting for about one-half of world requirements.

Of greatest importance among demand and trade restraining factors are governmental protectionist policies exemplified by revenue duties and internal fiscal charges, quantitative restrictions, tariffs, and state trading.

<sup>4</sup> Apart from the simple processing of primary materials manufactures, exports of underdeveloped countries consist very largely of textiles and jute goods.

It was found that duties and internal taxes levied by the major Western European countries on items such as coffee, cocoa, and citrus fruits accounted for 20, 9, and 11 percent of their respective retail values. By contrast the comparable figures for tea and bananas were low — amounting only to 2 and 4 percent.<sup>5</sup>

Quantitative import restrictions are applied by the industrial countries in general against a wide array of products such as vegetable seeds and oils, coffee, raw cotton, tobacco, tropical timber, manufactures of jute and cotton, and a number of other industrial goods. Notwithstanding some progress toward liberalization, the incidence of these restrictions is heavier on products originating in the less developed countries than those obtained from other areas.

Account must be taken also of tariff barriers which separately or in combination with quantitative restrictions impede trade. They are being maintained particularly with respect to vegetable oils, tropical beverage crops, manufactures of jute and cotton, sports goods, aluminum, ferro-alloys and copper rollings, leather products, and certain other commodities. Also a possible loss of export opportunities for less developed countries arises from the institution of surplus disposal schemes, involving either temperate or tropical zone products, and from the operation of price support programs.

Attention must then be given to the direction and magnitude of trade diversion resulting from the preference and growth effects of Western European economic integration. Clearly, the preferential terms of entry accorded to products of associated overseas countries will distort the normal competitive pattern of markets and ultimately reduce the de-

<sup>5</sup> "Tropical Fruit and Beverages: Duties and Taxes in Western Europe," UN/FAO, Monthly Bul. Agr. Econ. and Stat. 2(12):9. 1962.



mand for third-country exports.<sup>6</sup> This tendency is expected to be reinforced by the increased flow of public and private investments speeding up the economic growth of associated primary exporting countries. According to Thorbecke's estimates the emergence of the European Economic Community will be detrimental to exports from both temperate and tropical areas.<sup>7</sup> His analysis suggests that among nonassociated producing countries in tropical zones those of Latin America are likely to suffer the greatest loss of market.

Finally, it is appropriate to note that the relatively slow growth in population in the industrial importing countries may also have been an important causal factor keeping a check on the expansion of demand for tropical products. With respect to price behavior among the major tropical export products, coffee, cocoa, and rubber have exhibited the highest degree of variability. Considering that the price elasticity of demand for beverage crops in the importing countries is low, variations in supply generally result in large price fluctuations.

Apart from achieving political independence, industrialization has received top priority among national objectives of underdeveloped countries. As a result of the drive for industrialization, the rate of increase in imports during recent years has exceeded the growth in export earnings, thus causing continued pressure on

external balances. With disparities between domestic production and consumption of food, aid provided under the authority of U.S. Food for Peace and P.L. 480 programs has saved scarce foreign exchange reserves and released them for the purchase of investment goods. Some food also has been bartered for strategic commodities or donated to friendly foreign populations.<sup>8</sup>

Accentuating the strains on the external financial resources of underdeveloped countries is the loss in international purchasing power stemming from a deterioration in their terms-of-trade position. A fall in primary commodity prices relative to manufactures reduces the purchasing power of export proceeds. Such a fall also offsets some of the benefits of economic aid or loans received by these countries. Hence, from the standpoint of the industrial countries the gains accruing from lower raw material costs must be balanced against the loss in exports to underdeveloped countries. These deficits have been met by using foreign exchange reserves, private foreign capital investments, and public grants or loans. For instance, directional tax incentives have been used to attract foreign capital into a particular type of favored activity such as manufacture for exports.

There are, however, various reservations among the governments of underdeveloped countries regarding the extent and form in which foreign capital should make its contribution to the achievement of the industrialization objectives. An important aspect of this dilemma is posed by the desire to resolve conflicts between the imperatives of industrialization and

<sup>6</sup> According to the Treaty of Rome 16 overseas territories and countries of EEC members were given associate status for five years. This means that the products, consisting mainly of coffee, cocoa, vegetable oils and bananas, originating in these countries gain admittance into EEC on terms that discriminate against other nonassociated primary exporters in Africa or Latin America. The initial five-year term expired December 31, 1962, but new arrangements provide for another five-year extension of this association.

<sup>7</sup> Erik Thorbecke, *European Economic Integration and the Pattern of World Trade*. Amer. Econ. Rev. 53(2):147-173. 1963.

<sup>8</sup> For a discussion of this and other aspects of food aid, see E. L. Menzie, *et al.*, "Policy for United States Agricultural Export Surplus Disposal," Univ. Ariz. Tech. Bul. 150, Ch. 5, 1962; and Lawrence Witt and Carl Eicher, "The Effects of United States Agricultural Surplus Disposal Programs on Recipient Countries," Mich. State Univ. Res. Bul. 2, Ch. 5, 1964.



the emergence of popular sentiments and apprehensions against foreign domination of industrial ventures. Although various ways can and have been found which obviate the most frequently raised objections to private foreign investment this source of finance appears inadequate to meet the mounting demand of industrialization.<sup>9</sup>

For this and other reasons not elaborated here there is widespread interest in the feasibility of establishing an international mechanism which promotes the fullest possible access to markets of the industrial countries. The barrier to these markets which is perhaps the most difficult to overcome is that raised by the internal and external commercial policies of the countries concerned and the lack of formal international machinery facilitating their removal.

It is important to bear in mind that the commercial policies of industrial countries are frequently contradictory rather than complementary to some of their other policies aimed at speeding up the economic development of underdeveloped countries. Notably the benefits accruing from the pursuance of liberal economic aid policies may easily be dissipated by restrictive commercial policies which place a number of obstacles in the way of expanding exports from underdeveloped countries. Accelerating the rate of economic development and advances towards self-sustaining growth requires not only aid but opportunity for the opening of new trade channels and earning of foreign exchange. Concurrent with the advance in industrialization, dependence on trade increases and that on aid gradually becomes smaller.

This is not to suggest that all obstacles limiting exports of primary commodities and manufactures from the underdevel-

oped countries should be eliminated as rapidly as possible. The reduction in these obstacles could be gradually phased out as part of a long-run overall program oriented toward the liberalization of world trade and promotion of economic development.

Of special interest in this context are problems created by the differentiation, in the external commercial policies of industrial countries, between manufactures imports obtained from the less developed countries and those from other industrial countries. The obstacles imposed by the industrial countries on imports of these products consist mainly of tariffs, import quotas, and requests to the exporting countries for voluntary restraints on the volume of their exports.<sup>10</sup> While restrictions of this nature afford a justifiable protection to stagnant domestic industries in the short run there is reason to question whether such a course of action would serve the long-run interest of either the importing or exporting countries.

Undoubtedly the allocation of resources, in both the importing and exporting countries, to industries in which they enjoy greater comparative advantage will yield the greatest benefits to the trading parties. Accordingly, the difficulties confronting underdeveloped countries are not confined to market access arrangements alone but follow from national programs for industrial development which tend to emphasize balanced domestic growth rather than international specialization. A key problem to be resolved in this respect involves the assignment of priorities in the stimulation of export-boosting or import-substituting industries. If manufactures are to contribute to expanding export earnings of the underdeveloped countries in years ahead,

<sup>9</sup> U.N., Official Records of the Economic and Social Council. 32nd Session Annexes, agended items 2 and 5. Geneva. pp. 5-30. 1961.

<sup>10</sup> "Basic Instruments and Selected Documents," 8th Supp., 2nd Rpt. Committee III. GATT, Geneva.

it is desirable that these countries pay greater attention to the diversification of their industrial base and comparative efficiency of production.

It seems both possible and essential to arrive at a situation in which the underdeveloped countries end their dependence on the export of a limited range of raw materials susceptible to severe short-period instability. While the conclusion of international agreements governing trade in specific commodities has shown an encouraging trend toward intergovernmental cooperation, they have so far failed to offer promise of alleviating the adverse effects of instability. Such recognition has heightened interest in the formulation of transitory action programs that provide financial compensation for short term declines in export earnings until a more permanent solution can be worked out.<sup>11</sup> It should be emphasized that, with the lag between the demand for and supply of food, the underdeveloped countries must also pay attention to increased agricultural production.

In the light of past experiences the underdeveloped countries concluded that existing international agencies and institutional arrangements are ineffectual in bringing about reductions of trade barriers consistent with their aim of economic development. The GATT-sponsored negotiations and confrontations are a case in point. Progress in trade liberalization has been hampered, in addition to factors discussed earlier, by the fact that nontariff barriers and subsidies are not

subject to negotiation in GATT. Among the former, internal fiscal charges and quantitative restrictions pose the biggest obstacles to expansion in trade. Yet the beneficial stimulus engendered by the reduction or elimination of import duties and internal fiscal charges to the exports of primary producing countries should not be overestimated.

According to the findings of a recently concluded study the complete removal of taxes and duties might induce increases of about 11 percent in Western European imports of coffee and citrus fruits, about 8 percent in those of cocoa, and 5 percent in those of bananas.<sup>12</sup> In this connection it is important to bear in mind that the benefits of possible tariff concession secured through GATT negotiations may be impaired or nullified by the simultaneous introduction or raising of internal fiscal charges and other nontariff barriers. It is doubtful whether anything is gained if the complainant country invokes Article XXIII of GATT and asks permission to revoke its concessions. Moreover, many countries including the U.S.S.R. are not members of GATT and thereby do not become parties to any agreement that may be concluded.

The aspirations of countries that export primary commodities received formal expression in the "Declaration on Promotion of the Trade of Less-Developed Countries" adopted at the GATT Ministerial Meeting in November, 1961, and subsequently reiterated in the deliberations of the first U.N. Conference on Trade and Development, March 23 to June 15, 1964.<sup>13</sup> Particular emphasis was placed on trade, aid, and international

<sup>11</sup> For a review of various commodity stabilization arrangements, see "International Compensation for Fluctuations in Commodity Trade," U.N. publication, No. 61, II. D. 3. Par. 133-140, New York, 1961; "Trends in International Trade," Par. 222-246, GATT, Geneva, 1958; and R. F. Mikesell, "International Commodity Stabilization Schemes and the Export Problems of Developing Countries," *Amer. Econ. Rev.* 53(2):75-92. 1963.

<sup>12</sup> "Tropical Fruit and Beverages: Duties and Taxes in Western Europe," UN/FAO Monthly Bul. Agr. Econ. and Stat. 2(12):9-10.

<sup>13</sup> For a summary of specific recommendations made by the Committee, see "GATT Program for Expansion of International Trade, Trade of Less-Developed Countries." Spec. Rpt. Committee III. pp. 21-24. 1962.



commodity agreements as means to further the economic development of these countries.

With respect to trade, it was felt that every effort must be made to enlarge the flow of goods and equipment, both through existing facilities and the opening of new channels, between industrialized countries and those exporting primary commodities. Explicit recognition was given to the desirability of expanding trade with all countries or regions regardless of differences in their economic and social systems. In order to obtain maximum benefits from expanded trade the underdeveloped countries pressed for arrangements to ensure ready access to markets of the industrial countries without the granting of counter-concessions. Closely linked to this objective are the formulations of measures that discourage or prevent regional economic groupings from adopting policies of excessive agricultural protection prejudicial to the interest of efficient outside producers. In pursuit of these objectives the work of the conference overlaps that conducted by GATT.

Much consideration was given also to measures and programs for dealing with instability in primary-commodity markets, financing trade deficits, and refinancing overdue debts. A partial remedy for mitigating the problems created by short-term fluctuations in export earnings was provided through special drawing facilities at the International Monetary Fund (IMF). Since March 1963 member countries have been allowed to draw up to one-fourth of the amount of their IMF quota in currencies of their choice.

There was some opinion that the solution for instability lies in the establishment of international commodity agreements regulating the price, production, and marketing of principal export prod-

ucts. In addition to those currently in force, international agreements were proposed for a number of important commodities such as cereals, cotton, coconuts, jute, hard fibers, rice, rubber, lead, and zinc.<sup>14</sup> Regarding the financial aspects of the trade problem, efforts are underway to (a) devise a scheme providing international compensatory financing and (b) enlarge the purview of existing international institutions, permitting them to support the exports and imports of underdeveloped countries at terms best suited to their specific needs.<sup>15</sup>

While there is a considerable amount of interest in the formation of a completely new and full-fledged world trade organization it is too early to tell what course of action will be taken in this matter.

### **Temperate Food-Exporting Countries**

Agricultural protection in the industrial countries is the principal obstacle to the potential expansion of trade in temperate-zone products. Among the numerous motives for protectionist policy, three appear of decisive importance: food shortages, balance of payments difficulties of the early postwar years, and the tendency of agricultural incomes to lag behind the rise in industrial incomes.

In view of the progress toward self-sufficiency in food production, and the impressive gains in terms of gold and foreign exchange reserves, the argument for protectionist policies now rests on the need to support agricultural incomes. This objective is being pursued by means of raising domestic prices and thus excluding foreign competition. Indeed, because the agricultural vote is of great

<sup>14</sup> Commodities which currently are covered by international agreements are coffee, olive oil, sugar, tin, and wheat.

<sup>15</sup> For other items appearing on the agenda of the conference, see "World Agriculture," 12(4):9-11. 1963.

political importance in major importing countries, attitudes toward price and trade programs are conditioned as much by political as by economic considerations. About 20 percent of EEC's labor force is employed in agriculture as compared to about 8 percent in the United States.

Although at this time it is impossible to anticipate the level of prices to be established within EEC it seems apparent that the Common Market policy so far adopted affords a sheltered position to domestic producers and thereby works to the detriment of both domestic consumers and third-country suppliers.<sup>16</sup>

International discussion and negotiation to achieve some moderation in the degree of agricultural protection and to spur world trade forms an integral part of the work contemplated for the 1964 GATT meetings. The main stimulus for these meetings undoubtedly has come from the United States and has been supported by other exporters of temperate-zone products.

According to the conclusions and resolutions adopted by the GATT Ministerial Meeting of May 16-21, 1963, the trade negotiations shall (1) cover all classes of products — industrial, agricultural and primary, (2) in addition to tariffs, deal also with nontariff barriers to trade, and (3) aim at reducing barriers to exports of the undeveloped countries without reciprocity.<sup>17</sup>

These objectives are more easily sought

<sup>16</sup> For a comprehensive treatment of the impact of integration on third country exports to EEC, see Elmer W. Learn, "Long Term Effects of Common Market Grain Policies," *Foreign Agricultural Trade of the United States*, ERS, USDA, Jan. 1963; and Lawrence B. Krause, "The Common Market: New Challenges to U.S. Exports," in *Factors Affecting the United States Balance of Payments*, Part 2, Joint Econ. Committee Print, Washington, D.C. 1962.

<sup>17</sup> For a complete list of principles and procedures adopted for the conduct of GATT negotiations, see "World Agriculture" 12(4): 7-9. 1963.

than achieved. One basic difficulty is that the GATT framework of trade negotiations is more suitable for the treatment of industrial than of agricultural products. The essential problems in this respect are that GATT does not differentiate, in principle, between trade in agricultural and industrial products and that it appears ineffectual in coping with nontariff barriers to trade.<sup>18</sup> Because tariffs are of minor importance in the control of trade of agricultural commodities, the task of trade liberalization will fall on leveling a multiplicity of nontariff barriers. These can range from import quotas and licenses to state trading.<sup>19</sup>

### Nontariff Barriers

GATT rules still permit the application of many nontariff restrictions, although they are subject to carefully specified conditions. Included are national security interest; health, safety, and sanitary regulations; protection of public morals; and the securing of compliance with laws or regulations which are not inconsistent with the provisions of GATT. In the case of the latter condition, Article XI of GATT permits the application of import restrictions to those agricultural products for which domestic production control measures are in force. It must be recognized that with the reduction or elimination of tariff barriers these restrictions assume an increasing role in hindering freer world trade. Even quantitative import restrictions can be circumvented by indirect barriers such as excise taxes, horsepower taxes, and health and safety regulations. Also, taxes can be graduated

<sup>18</sup> "Basic Instruments and Selected Documents." 7th Supp. GATT, Geneva. 1959.

<sup>19</sup> For a nearly complete list of remaining quantitative restrictions on imports in use, see Joint Economic Committee, "The United States Balance of Payments — Perspectives and Policies." U.S. Govt. Print. Office. Washington, D. C. pp. 140-159. 1963.



in such manner that their incidence becomes discriminatory against imported goods.<sup>20</sup>

### Export Subsidies

As in the case of quantitative restrictions, GATT is also opposed to export subsidies. According to Article XVI (B:2), "The contracting parties recognize that the granting by a contracting party of a subsidy on the export of any product may have harmful effects for other contracting parties, both importing and exporting, may cause undue disturbance to their normal commercial interests, and may hinder the achievement of the objectives of this agreement." This article further states that, insofar as such subsidies are nonetheless used they should not "result in obtaining for the subsidizing country more than an equitable share of the world export trade in the product concerned." For nonprimary products, subsidies are prohibited under a declaration which became effective in November 1962, provided that they result in a lower export price than domestic price for the same product. Remission of sales and excise taxes on exports also results in lowering export prices below the levels of domestic prices. This practice is widely used by various continental European countries and it places the United States at a competitive disadvantage relative to producers from these countries.

<sup>20</sup> Thus, U.S.-made cars with comparatively higher horsepower engines might become easy targets for such types of unfair trade practice. For instance, Italy has a road tax which puts an extra \$450 duty on standard American cars, \$170 on American compacts, \$44 on Volkswagens, and only \$17 on the domestically produced Fiats; on this, see "United States Policy Toward the Common Market and the North Atlantic Community," a background paper for the Sixth Midwest Seminar on U.S. foreign policy, Racine, Wis., Nov. 14-16, 1963, Institute for World Affairs Education, Univ. of Wis., p. 94, 1963.

### Quantitative Restrictions

It should be realized that the United States is not without blame in regard to the use of nontariff measures. Import restrictions are imposed under the statutory authority provided by Section 22 of the Agricultural Adjustment Act of 1935. This section extends protection to any agricultural commodity or product thereof for which production control, price support, or marketing programs are in effect. It is designed to curb the imports of such commodities which render ineffective or materially interfere with any program or operation undertaken by the U.S. Department of Agriculture. Import quotas can, under this law, be introduced up to 50 percent of a base period, or fees can be applied in addition to regular tariffs, up to a limit of 50 percent ad valorem.<sup>21</sup>

Because quantitative restrictions are incompatible with membership commitments assumed under GATT, the United States requested permission for their continued use. Despite the protest of other members, GATT granted a special waiver of obligations in 1955 to cover Section 22 restrictions.<sup>22</sup>

Apart from direct restrictions, imports may also be curtailed through bilateral agreements. Agreements were made with Canada in 1953 to curb imports into the U.S. of oats, with Argentina and Paraguay in 1954 to limit imports of tung nuts and tung oil, and with New Zealand, to limit imports of cheese. More recently in an effort to bolster or to prevent further declines in domestic meat prices, es-

<sup>21</sup> For an analysis of the impact and implications of Section 22 restrictions on U.S. imports, see Elmer L. Menzie, "Special United States Restrictions on Imports of Agricultural Products," *Jour. Farm Econ.* 45(5):1002-1006, 1963, and Varden Fuller and Elmer L. Menzie "Trade Liberalization vs. Agricultural Import Restrictions," *Jour. Farm Econ.* 46(1):20-38, 1964.

<sup>22</sup> See "Basic Instruments and Selected Documents." 3rd Supp. GATT. p. 35. 1955.



pecially of low-grade beef, the administration sought voluntary restraints on exports to this country. Under the terms of an agreement reached in the spring of 1964, Australia, New Zealand, and Ireland committed themselves to limit their 1964 meat exports to the average 1962-63 level. These limits will be enlarged by an annual rate of 3.7 percent during 1965 and 1966. With respect to nonagricultural products, the United States maintains quantitative restrictions on imports of petroleum, lead, and zinc.

According to a recently concluded study, 26 percent of the value of U.S. agricultural production is shielded against outside competition by nontariff import restrictions. By contrast the average tariff rate on dutiable imports was 10 percent in 1959. On the basis of this criterion, the degree of protection afforded by France, Germany, and the Netherlands amounted to 94, 93, and 79 percent respectively.<sup>23</sup> It should be borne in mind, however, that such a method of comparison does not allow one to estimate the magnitude of trade diversion ascribable to the application of restrictions. Although there are differences in scope, type, and number of protective devices authorized under Section 22, its overall objective parallels that of the variable levy system of the EEC. Then too, because of its potentially wide applicability the protective capacity of Section 22 approaches that of the variable levy system.

Invariably the application of nontariff import restrictions is so closely bound up with domestic policies of price and income support that these restrictions become an essential part of the system. As the U.S. and Western European experiences demonstrate the success of domestic price support, production and marketing control programs necessitate the employ-

ment of import-restrictive measures. The nature and consequences of interdependence between domestic and foreign trade policies has been the subject of much discussion and needs no further recapitulation here.<sup>24</sup>

Viewed against this background it is not surprising why efforts in the past met with comparatively little success in resolving agricultural trade differences. The establishment of Committee II in November 1958 marked the beginning of discussions and reviews of agricultural policies of the contracting parties to GATT. Specific tasks of Committee II, among other things, were to (a) examine the effect of nontariff measures for agricultural protection, (b) consider the extent to which the existing rules of GATT, and their application, have proved inadequate, and (c) suggest procedures for further consultations among all contracting parties on agricultural policies.<sup>25</sup>

Committee II expressed concern over the degree and extent of agricultural protectionism, the widespread resort to nontariff devices, and the serious effect which those devices had on international trade in agricultural products.<sup>26</sup> These issues became the starting point for further negotiations through the newly established GATT committees for cereals, meat, and dairy products. Among them the Cereals Committee, consisting of representatives of Australia, the United Kingdom, Argentina, Canada, the EEC, and the United States, commenced

<sup>24</sup> See, for example, D. Gale Johnson, "A Sound Trade Policy and Its Implications for Agriculture;" and Lawrence Witt, "Trade and Agriculture Policy," *The Annals of the American Academy of Political and Social Science. Agricultural Policy, Politics and the Public Interest*. pp. 1-13. Sept., 1960.

<sup>25</sup> For further elaboration on these points, see "Basic Instruments and Selected Documents," 7th Supp. GATT, Geneva. 1959.

<sup>26</sup> For more details, see "Trade in Agricultural Products," 2nd and 3rd Rpts. Committee II. GATT, Geneva. pp. 18-26. 1962.

<sup>23</sup> USDA, ERS, and FAS, *Agricultural Protection by Nontariff Trade Barriers*. Foreign-60. Washington, D. C. p. 3. Sept., 1963.



discussion in June, 1963, aimed at the development of international agreements covering world trade in cereals, the setting of domestic prices, and production goals. The codifying and harmonizing of EEC regulations pertaining to rice, dairy products, beef, fats, and oils, may speed progress toward these goals.

### **International Commodity Agreements**

The negotiations contemplated under GATT auspices (Kennedy-Round) are expected to place increased emphasis on international commodity agreements as a means of facilitating the long-range growth of world trade. Specifically efforts will or should be directed to (1) negotiate a guaranteed access to a share of the world market, together with a share of its growth, (2) stabilize prices of agricultural commodities and reduce the discrepancy between domestic and world market prices, (3) establish production goals, (4) prevent the dumping of farm commodities by major exporters, and (5) find ways and methods by which agricultural surpluses can make their most constructive contribution to economic development. These various objectives tend to reinforce each other. The first problem to be faced concerns agreement over an equitable basis or formula for determining what each exporter's initial quota or share in the market should be and how to adjust the quotas over a period of time. This consideration is especially important for the United States which proposes that market shares should be set in conformity with the level of imports prevailing in a recent representative period.

The goal of international price stability implies benefits and responsibilities for both net-importing and net-exporting countries. It protects domestic agriculture against the unlimited entry of competing imports at prices which would

disrupt the orderly conduct of national agricultural policies. Also, it enables the importing countries to achieve a greater measure of independence from price variations emanating from abroad, which lie beyond their control. Yet, it should be recognized that interference in the price mechanism distorts existing price differentials and thereby affects the international competitive position of participants' exports.

Ideally, of course, prices should be set at levels that would guide production and consumption towards an equilibrium. The general welfare can be improved only if a country or region diverts resources into the production of commodities in which it has the greatest comparative advantage, and accepts imports of those commodities in which it has the least comparative advantage. For the latter group of commodities, and over a transitional period, a system of deficiency payments of income support would be more appropriate than one based on direct price supports. The main advantage of this system would be that it involves a minimum of interference with the normal operations of the market forces in the importing countries, and with the patterns of trade. Also, in view of year-to-year variation in crop production a price policy directed mainly towards stabilization will be ineffective in guaranteeing farmers an assured income level. This raises the question of whether the objective of price stability is reconcilable with objectives of income parity and efficiency of production. It is beyond the scope of this paper, however, to elaborate on this and other ramifications entailing price decisions.

Perhaps of equal or even greater importance than price decisions is the question of production controls or marketing quotas. Unless price support programs are combined with some form of supply management there will be an incentive



to greater production, and with it the emergence of surpluses which are or promise to be unsalable in the commercial market. Aside from the effects of price policies, agricultural productivity and output are expected to increase due to the accelerated application of new technology.<sup>27</sup> The deficiency of a system of multilateral commodity agreements lacking production or marketing controls would presumably resemble that attributed to the International Wheat Agreement.<sup>28</sup> In short, the success of such commodity agreements will hinge in an important degree on (a) the production responses in countries that are partners to the agreement, (b) the emergence of new low-cost supplies, and (c) concerted international action toward an optimum disposal of surpluses through noncommercial outlets.<sup>29</sup>

While there has been some improvement in the world food situation, the differences among countries in the level of calorie intake and the nutritional quality of diets are still striking. This concern found widespread recognition by the launching of the "Freedom From Hunger Campaign" in 1960 and the World

Food Program in 1963 under the auspices of the United Nations. Both programs call for multilateral efforts to deal with hunger and malnutrition afflicting large segments of the world's population, and both regard food aid as an essential ingredient in furthering economic development.<sup>30</sup>

The World Food Program encompasses three activities — to provide emergency food assistance, to support special feeding projects such as those operated by schools and hospitals, and to underwrite economic and social development schemes. The highest priority is accorded to programs facilitating agricultural development and the creation of social overhead capital. In this domain, preference is given to labor-intensive work projects in which part of the wages are given in food.<sup>31</sup>

Disregarding the question of comparative efficiency between food and other forms of assistance as means of sustaining or accelerating economic growth, the institution of joint surplus-disposal programs would convey a higher measure of continuity to the recipients than if separate programs were maintained by individual countries. Clearly the administration of such programs requires that eligibility for food aid be made subject to systematic reviews, and terminated wherever it is found that the recipients are able to procure their requirements on a commercial basis.

### The U.S. Position

The negotiating position of the United States as articulated by leading governmental spokesmen seeks to strike a balance between the legitimate objectives of

<sup>27</sup> See Joint Economic Committee, "Food and People." U.S. Govt. Print. Office, Washington, D. C. pp. 9-12 and 37-41. 1961.

<sup>28</sup> For a discussion of problems inherent in various types of international commodity arrangements, see Helen C. Farnsworth, "International Wheat Agreements and Problems," *Quar. Jour. Econ.* 70(2):217-248, 1956; and Boris C. Swerling, "Problems of International Commodity Stabilization," *Amer. Econ. Rev.* 53(2):65-74. 1963.

<sup>29</sup> See Willard W. Cochrane, Arthur B. Mackie, and Grover C. Chappel, "Potential Uses of Farm Products as Aid to Developing Countries," *Jour. Farm Econ.* 45(5):961-973. 1963. For some novel ideas relating to the nature and scope of U.S. food disposal programs and their coordination with those of the FAO, and other countries acting independently, see J. S. Hillman, "Suggested Modifications in Public Law 480," a paper delivered at the Annual Meeting of the Western Farm Economics Association, Laramie, Wyoming, July 26, 1963.

<sup>30</sup> See Oris V. Wells, "Thirteenth General Conference of IFAP. FAO's Campaigns and Programs Can Advance IFAP Aims." *World Agriculture* 12(2/3):5-8. 1963.

<sup>31</sup> See A. H. Boerma, "The World Food Program: Situation and Outlook." *World Agriculture* 12(2/3):9-13. 1963.



the EEC and the traditional interests of the exporting countries.<sup>32</sup> Specifically the points at issue revolve around maintaining and expanding market opportunities for temperate-zone exports, international cooperation and coordination of efforts for carrying reserve stocks of wheat and feed grains, and the sharing of food aid responsibility to underdeveloped nations.<sup>33</sup>

In order to assure continuing access to commercial markets the United States proposes application of the linear reciprocal tariff cutting principle on agricultural products burdened with fixed import duties, placing of ceilings on variable levies, and restrictions on the imposition of minimum prices now widely used in the EEC.<sup>34</sup> Agricultural trade liberalization may be pursued jointly with or independently of industrial items. When tariffs on agricultural commodities pose the major barriers to international trade they should be handled together with industrial products and reduced on a reciprocal basis. Further, the U.S. plan recommends that appropriate steps be taken to modify, eliminate, or avoid the use of nontariff barriers that impede trade. Much importance is attached to developing international commodity agreements combined with market-sharing arrangements and the stabiliza-

tion of world prices. Negotiations for such agreements already are in progress for cereals, meat, and dairy products.

The achievement of these objectives, among others, requires that national and regional agricultural policies be subjected to international scrutiny and negotiation. The apparent disposition of the United States to bargain with other nations on matters of domestic farm policies and to assume reciprocal commitments represents a major departure from previous trade negotiating postures. It seems to be predicated on the recognition that new and multilateral techniques must be found in order to provide for the needed future expansion of agricultural trade and better utilization of agricultural surpluses. Progress in this area will depend, to a considerable extent, upon U.S. willingness to offer concessions on restrictions maintained under the authority of Section 22 of the Agricultural Adjustment Act, for which it received a waiver of obligations from GATT.

In view of the urgency of restoring balance in U.S. international payments, the development of a formula providing for a greater sharing of the burdens of foreign assistance is receiving high priority among policy considerations. Although a number of steps have been taken to cut down spending abroad and to assure that an increasing share of foreign assistance appropriations is being spent on domestic goods and services, it is felt that they are inadequate to remedy the situation.<sup>35</sup> Measured in terms of defense expenditures, those made by the United States are about three times the combined outlays of all other NATO

<sup>32</sup> In particular, Secretary of Agriculture Orville L. Freeman outlined the basis of a policy in his address to the European-American Symposium on Agricultural Trade in Amsterdam, Nov. 15, 1963 (see "European Community," No. 67, Nov.-Dec., 1963, p. 4), and in a statement (see "Foreign Agriculture" including Foreign Crops and Markets 2(8):3-4, 1964).

<sup>33</sup> In reference to stockpiling, the proposal calls for the establishment of national food banks serving to stabilize supply.

<sup>34</sup> While fixed import duties are the prevalent form of protection used by the major trading countries, at present EEC maintains them on tobacco, vegetable oils, and canned fruits. By contrast, grains and livestock products are covered by the variable levy system.

<sup>35</sup> On these points, see Joint Economic Committee, "The United States Balance of Payments—Perspectives and Policies." U.S. Govt. Print. Office, Washington, D. C., 1963, pp. 33-60; and Hal B. Lary, "Problems of the United States as World Trader and Banker," Nat. Bur. Econ. Res., New York, 1963, Ch. 4.



countries. When a comparison is made on the basis of the proportion of GNP allocated to foreign aid, the United States falls behind France and Portugal.<sup>36</sup> Apart from balance of payments difficulties, the demand for a more equitable sharing of the foreign assistance burden (greater contribution by several leading industrial countries) gained momentum from their spectacular economic advance scored during the postwar period.

It must be remembered also that by virtue of economic integration the political and economic weight of Western European countries in general, and those of the EEC in particular, became larger than the sum total of their individual members when acting in isolation. Consequently member countries' national as well as regional policies have implications extending beyond their own boundaries. This consideration, it is hoped, will transcend attitudes of member countries as they accept their responsibilities in shaping the course of world trade and the pace of economic development of the underdeveloped countries.

### Summary and Implications for Research

The negotiations and confrontations carried on through the conferences sponsored by the United Nations and GATT represent a new phase in the continued quest for freeing and expanding international trade and speeding up the economic development of countries that export primary commodities. The emergence of regional economic trading blocks gives new urgency to market access arrangements on terms acceptable to both tropical and temperate-zone agriculture.

In pursuit of these objectives the temperate-zone exporting countries, in-

cluding the United States, are calling for (1) abandonment or moderation of policies of domestic self-sufficiency that threaten to destroy traditional patterns of world trade in agricultural products, (2) development of market access and sharing arrangements on the basis of international commodity agreements, (3) application of the linear tariff cutting procedure on agricultural products, and (4) institution of joint economic development schemes encompassing both food and other forms of assistance.

The underdeveloped countries which export primary commodities are pressing for (1) international commodity agreements and compensatory measures to offset fluctuations in trade, (2) broadening of the range of negotiable nontariff barriers to trade, with special reference to internal fiscal charges and import duties applied against noncompeting products and quantitative restrictions on manufactures, (3) strengthening the retaliatory capacity of Article XXIII of GATT against the possible nullification or impairment of tariff concessions by way of nontariff barriers, and (4) arrangements that lead to improvement of the terms of trade between the countries that export primary goods and those that export industrial goods.

Moreover, it is necessary to emphasize that the countries exporting primary goods must pay greater attention to the question of international specialization and diversification in their industrialization policies.

The main question that emerges from the foregoing review and appraisal of professed objectives and aspirations of the two categories of countries is the efficacy of means to be employed toward their achievement. Any decision or commitment in this matter must be made conditional upon a systematic and coordinated study of the basic issues involved,

<sup>36</sup> For a comparison of the relative contributions to defense and economic assistance of the United States and other countries in terms of GNP, see Joint Economic Committee, *op. cit.*, p. 50.



the potentialities of the existing institutional facilities, and the desirability and appropriate form of proposed changes in institutional arrangements. In this context three research areas are distinguishable: (1) the scope, form, and auspices under which existing or any new international commodity agreements scheme should operate, (2) ways and means to liberalize interregional trade, and (3) formulation of action programs contributing to an accelerated and self-sustained economic growth of underdeveloped countries.

The international commodity agreements approach poses several questions and challenges to the researcher, including (1) the choice of the particular operational techniques among (a) multilateral long-term contracts for the purchase and sale of commodities, (b) international export quotas for the restriction of market supply, and (c) buffer stock agreements; (2) providing better understanding of the causes and consequences of instability in primary commodity markets; (3) devising criteria for allocating market shares, enforcing compliance with assumed contractual obligations, and achieving the widest possible adherence to the agreements; (4) the choice of international compensatory measures to offset fluctuations in commodity trade; and (5) the sharing of the fiscal burden of surplus disposal and direct intervention in commodity markets.

The success of trade liberalization efforts depends upon the initiation of studies that provide (1) information on the nature and extent of economic, political, and social motives inspiring the

pursuance of protectionist national and regional policies, (2) identification of incipient and actual structural maladjustments in individual commodity markets, in both temperate and tropical zones, and the factors causing them, (3) greater knowledge about prospective trends in demand and supply for individual commodities in both the net-importing and net-exporting countries, and (4) estimates of the amounts of trade expansion expected with the removal of tariff and nontariff obstacles maintained by the leading import countries.

The formulation of appropriate and effective international measures for stimulating the economic advancement of underdeveloped countries calls for studies oriented toward (1) the identification of principal obstacles to economic growth, (2) an appraisal of the nature and degree of interdependence among the pace of internal economic growth, the level and pattern of exports, and the rate of increase in import demand of the underdeveloped countries, (3) the establishment of order of priorities in the promotion of import-substituting and export-expanding industries, and (4) the optimum division of developmental tasks among private and public enterprises, both foreign and domestic.

In conclusion it is recognized that the suggested research areas are somewhat arbitrary and are also confined to only a few specialized aspects of international trade. Owing to the high degree of interdependence existing among various sectors of the international economy, an alternative and equally plausible set of priorities for areas of research could be proposed.

# Estimating Export Potentials for U. S. Agricultural Products<sup>1</sup>

T. A. HIERONYMUS

Department of Agricultural Economics, University of Illinois

**M**Y ASSIGNMENT DEPARTS somewhat from the context of this conference. We now turn our attention from the place of agriculture in the development of economically less-developed countries and areas to the mundane matter of how to sell more U.S. agricultural products abroad. The conference theme has an aura of missionary-like service about it, while my topic is a strictly commercial one. If I did not feel an obligation to stay within reasonable range of my topic, it would be interesting to argue that U.S. efforts in export market development may be more useful in the development process than some of the more direct development activities as they are currently practiced.

Studies of potential exports of U.S. agricultural products are useful activities of research workers at agricultural experiment stations, in the USDA, and in commercial firms engaged in processing and exporting. The importance of export markets to U.S. agriculture has already been pointed out. The developments in exports, in terms of the kinds of products and their destinations, are quite dynamic. The professional economist can certainly be useful in suggesting future developments and in guiding the sales activities of commercial firms.

The finding of markets and short-term sales activities are responsibilities of commercial firms. Their salesmen canvass the markets thoroughly and competently. The United States has been an agricultural export nation throughout its

history. A large group of competent export firms was developed a long time ago. We are not talking about a new or neglected area.

The first area of contribution of the professional economist is in guiding capital investment in export activities. The investment of capital involves the prospects for its recovery, and this recovery requires time. The longer-term export prospects are important in investment decisions. Longer-term export potentials are many faceted and complex. The analytical tools and judgments of economists can be useful in making capital investment decisions.

A second way in which studies made by economists are useful has to do with the rather high regard in which publicly employed people, such as professors and government employees, are held in many countries of the world. Part of market development consists of influencing changes in recipient countries. Suggestions for changes, both in governmental activities and technical processes, are often better taken if made by a professor than if made by a representative of a commercial firm attempting to open up a market. Specifically, if I suggest that the addition of vitamin B-12 would improve Japanese soybean meal (which relates to potential exports of U.S. soybeans and corn) the suggestion is more apt to be acted upon than if it is made by a vitamin salesman. This is not to say that my suggestions have more merit—the opposite may be true. The suggestions of a professional economist with regard to agricultural policy, or comparative advantage in production of specific

<sup>1</sup>The author's comments have been influenced by a recent trip to Japan under a grant from the Agricultural Development Council, Inc.



crops, carry more weight than similar suggestions made by commercial representatives.

What I really want to emphasize is that the course of economic events is influenced by research activities, and in view of the large potential returns from increased sales in relation to the cost of studies, such studies should be made.

### **Specific Studies**

Studies of agricultural export potential, if they are to be effective in stimulating exports, must deal with specific topics. An example might be "The Potential Export of U.S. Corn to Japan for Use in Livestock Feeding." Such a study could serve as a basis for action by commercial firms. This is not to suggest that individual studies should be made without regard to others. Many of the measurements needed in making a study of exporting corn to Japan for feed also need to be made in a study of soybean meal to Japan for feed. Similarly, some of the factors affecting corn to Japan for feed also affect corn to Belgium for feed, or, for that matter, to Jamaica.

The key point is that studies of export potential need to be sufficiently specific to provide a basis for action by commercial firms. It must be kept in mind that firms sell and export individual lots of a commodity and that firms buy and import individual lots of a commodity. Both sides of each transaction intend and expect to make a profit. The people involved act on research results. If research results are to be meaningful, they must be specific enough to be useful to individual firms.

### **The Scope of the Task**

If we impose the requirement of being specific, we outline a very big task for people and institutions engaged in research regarding export potential. Count-

ing countries in the world today is not a very rewarding exercise — the number and identity seems to change fairly rapidly. Similarly, many different commodities of agricultural origin move in international trade, and while we can group a fairly high proportion of U.S. agricultural exports into a few groups, we always end up with a large "other" category that includes many products. We can also isolate a relatively few countries that take a fairly high proportion of the total U.S. agricultural exports, but again we find a rather large "other destinations" category left over.

The multiplicity of commodities and destinations makes the size and complexity of analyzing and describing the export market potential for U.S. agricultural products readily apparent. The total job is huge.

Some kind of meaningful grouping can be made. Two lines of studies immediately become apparent. First, studies of potential outlets for a commodity or group of commodities can be made for all of the major destinations. That is, one works from the orientation of the economics of a commodity group. We have people who know a great deal about the economics of edible fats and oils, or manufactured dairy products, or wheat, or cotton, etc. They can thus most effectively study the potential outlets for a commodity. Second, the potential imports of U.S. agricultural products by a specific country or area can be examined. Such topics as "Japan As a Potential Market for U.S. Agricultural Products" are appropriate. Many other names such as Pakistan, Spain, or the European Economic Community can be substituted for Japan. One thus becomes a country or area specialist and proceeds from such an orientation.

It is readily apparent that the commodity specialist must expand his knowl-

edge to include the internal demand structure of the recipient countries. Similarly, it is readily apparent that the area specialist must expand his knowledge to include the technical aspects of commodities in that area.

Thus, studies of market potential must encompass two broad areas: the economics of individual commodities and commodity groups, and the economics of the demand structure of recipient countries. It seems to me that there is a strong case to be made for some kind of group approach and for a series of continuing studies in these two areas. If one research worker undertakes and reasonably well completes a study of the potential export of vegetable oils to Turkey, he will have left over a large amount of knowledge about vegetable oils that can be used in exploring vegetable oil export potential to other countries and areas, and a large amount of knowledge about Turkey that can be used in examining the potential export of other commodities to Turkey.

With these comments I am emphasizing the need for a major and continuing effort in export market potential so that full advantage can be taken of the knowledge accumulated from individual studies. Actually, the need has long been accepted, and lines of work have been initiated. The Illinois Agricultural Experiment Station has maintained a major line of work in this area, supported with substantial resources, for a number of years. Other experiment stations have worked in the area. Trade groups, such as the Nebraska Wheat Commission and the Soybean Council of America, have worked on market potential. The Foreign Agricultural Service (including its earlier names such as The Office of Foreign Agricultural Relations) has maintained a continuing and major effort in this work, and is currently contributing major resources.

Thus it seems that much information has been accumulated, that useful specific studies are being made, and that many more specific studies can be made at relatively low cost.

### **The Process of Specific Studies**

I believe that the most effective specific studies are made by putting a commodity specialist or team of commodity specialists inside a country for a careful look at the market potential for a commodity or commodity group. After some experience, both in direct participation and from reading a substantial number of reports, I have arrived at a four-step process that can be followed in making a study: (1) establishing a frame of reference, (2) preparation in advance of travel, (3) on-the-ground observation, and (4) summarization and conclusion. Let us briefly consider each of these steps.

### **Framework of Reference**

The central question is: "What will the export volume of blank to blank be during the next several years, and what action can be taken to influence the quantity upward?" The answer to this double-barrelled question must be sought within the context of a set of factors affecting the imports of a commodity or commodity group from the United States. I like to list five factors:

**The demand structure.** How large the demand is and will be depends upon several things. First, and most obviously, population plays an important role in demand and demand change over time. Demand for agricultural products and population change are positively related. Second, and generally more important than population, is income. People buy things with income; thus, the larger their incomes, the greater their purchases. The third demand factor is income expenditure preferences.



The price elasticity and income elasticity of demand are major factors affecting demand. I wish to stress this point because of the great variability among countries. Observations made in the United States cannot be applied to other areas. Similarly, I distrust observations of demand elasticities made in other countries by the methods currently in vogue in the United States. What people elect to spend their incomes on varies greatly with nutritional levels, income levels, rates of income changes, and traditional dietary pattern. At less than subsistence levels the income elasticity of the demand for basic foods such as rice, wheat, and the root crops is great. As the subsistence level is crossed, the income elasticity of demand for basic foods decreases quickly and the income elasticity of demand for the preferred food — generally of animal origin — increases and generally appears to be high. Rapidly changing incomes appear to result in different income elasticities of demand than to slowly changing income levels.

The investigator should take a minimum of traditional U.S. concepts of price and income elasticity of demand with him as he goes into the demand structure of another country.

One thorny problem in dealing with income expenditure arises from the traditional consumption patterns in other countries. In looking at food consumption, the investigator quickly encounters statements about local tastes, traditions, religious teachings, etc., which result in stable patterns that are difficult, if not impossible to change. I think that such tendencies are overstated. Tastes in food are more absolute than is generally thought. For example, the Japanese people are changing, as incomes permit, from miso and rice to prepared cereals, toast, and bacon and eggs for breakfast. This is not an insidious western influ-

ence, but rather an absolute difference in quality. The same choice would be made in Illinois, Moscow, or Nigeria.

The same problems are encountered in choices made between food and non-food expenditures. Such choices are dependent on many factors peculiar to the local situation. They are subject to availabilities of competing products, relative prices, and credit availability as well as community standards and traditions. As in the case of food, I think that basic real income expenditure preferences are quite universal.

**Marketing arrangements.** The availability of a food distributing and merchandising system is an important consideration in the size of the market for food. If processing, transportation, and retailing facilities are not available, or are available only at high cost, the potential market for agricultural products cannot be exploited. The speed with which a potential market will materialize depends, in part, on the speed with which marketing arrangements are developed.

In this same category of marketing arrangements, I would include a lot of agricultural technology. For example, the food demand structure of Japan indicates a continuing rapid expansion in imports of the raw materials for livestock products, specifically feed grains and soybean meal. The exploitation of this demand requires the application of new technology to mixed feed formulation, and to broiler, egg, pork, and milk production. The technology is largely known. It has to be taught and capital has to be invested. The cursory examination of this sector of the Japanese economy that I recently made suggests a rapid implementation of technology, hence market growth, during the years immediately ahead. A similar examination in a different place might (and probably would) lead to a different conclusion.

**Agricultural protection.** Throughout most of the world, farmers occupy a favored political position. There are several reasons for this: their incomes are relatively low; they have disproportionate representation in government; nations wish to protect food supplies with large, indigenous production; nations wish to protect exchange balances by keeping agricultural imports low; and rapid out-movements of people from agriculture are politically and economically unsettling.

Agricultural protectionism of other countries works two ways with regard to U.S. agricultural exports. First, it holds resources in agriculture that would otherwise be priced out of agriculture, thus increasing competition for U.S. products. Second, it usually holds food prices high which in turn retards consumption, particularly in the shifts to preferred foods. This second factor may be avoided by direct subsidies to farmers, although this is not a generally preferred method because the cost is readily apparent.

**Trade position and policy.** Many nations are plagued by balance-of-payment problems. Also many nations use selective import restrictions and taxes to affect the kinds of goods that are imported. Such restrictions are designed to balance export and import trade and to channel imports into capital goods and raw materials for manufacture and re-export to the maximum extent possible. Restrictions are thought to accelerate economic development.

In actual practice, import restrictions, currency regulations, and export stimulation become a blend of protection for selected groups, necessary extensions of internal monetary and fiscal policies, and deliberate programs for economic development. Certainly they are important

factors in the amount of U.S. agricultural products imported.

**Competing supplies.** The amount of U.S. products that can be exported to a given country depends in part on the supplies available to that country from both internal and third party sources. In the short run, domestic supplies have an almost unbeatable advantage. In the longer run, the competitive positions of the United States and the destination country with regard to a particular commodity should determine the amount of imports. This competitive adjustment is usually affected by import-export regulations and internal subsidies. The persistence with which destination countries will lose money on agricultural support is a key factor in the rate of adjustment to the real competitive situation.

Because the United States is the sole exporter of few, if any, commodities, competition from third parties must be evaluated. Quantities available and the competitive production conditions between the United States and other suppliers are not the only factors to be taken into account in appraising competition. There are quality differences that are sometimes quite subtle. For example, the Japanese are sensitive to the depth of color of yellow corn. They think that the darker corn results in darker yolks of eggs when fed to hens, and this is a consideration that must be taken into account in market appraisal.

The reliability of delivery dates and ease of contract settlement are also factors in choosing suppliers.

The trade position of the recipient country with the various available suppliers may be a factor in the choice of sources. In this world of imperfect currency convertibility, buying countries sometimes influence purchases toward those countries to whom they wish to ex-



pand sales. All other things being equal, I think that Japan would prefer to buy corn from Thailand than from the United States.

### **Advance Preparation**

The success of a study of export potential in a particular country is largely determined by the amount and quality of advance preparation. This is an often neglected part of a specific study. The researcher should study first and look later, rather than the other way about.

Thorough advance preparation serves two purposes: it serves as a guide to what the researcher should do in the subject country or area, and it greatly improves the quality of the discussions that he has with people in the subject country.

To a considerable extent it is easier to study a country from a distance than from close at hand, particularly for those of us who are literate in only one language. It is sufficiently difficult to get about in a strange country and see the appropriate people without adding the burden of having to do an extensive amount of collecting statistics and reference material and identifying the proper contacts as well. Study is more comfortable and effective at home.

The quality and amount of information that can be obtained in an interview is increased if it is clear that the interviewer knows the facts about the subject at hand and is probing for implications. The job is difficult and far less productive if the interviewer must have the factual situation described and has not had an opportunity for prior thought about implications. If the researcher has done his homework so that he can meet the subject of the interview at his own level, meaningful answers can be obtained and time saved. The implications

of an import allocations policy is a better subject for discussion than is a description of an import allocations policy. Prior knowledge is more meaningful and adds more to responsiveness in foreign countries than it does at home.

Advance preparation can be divided into three general categories. First is the collection of pertinent statistical data. Second is the extensive reading of descriptions, studies, etc., regarding the production and utilization structure of the commodity in question, demand, institutional arrangements, agricultural production policy, and international trade policy.

If these two things are done thoroughly, it would be entirely possible to establish hypotheses and draw inferences without going inside the country at all. When the researcher is prepared to write his report, he is ready to go abroad.

The third category is the developing of an outline specifying people to see and places to visit. Previous preparation will suggest the kinds of people and places desirable. Identities of people in trade associations, firms, governmental positions, and universities are readily available. In this connection, a sponsoring agency is of particular value. These lists should be kept flexible and can be evolved as the study proceeds, but a fairly complete list should be in hand before departure.

### **On-the-Ground Observation**

The trip abroad should be primarily devoted to talking to people and seeing things. Supplementary data and information can be collected to fill in the gaps left in the advance preparation process.

The interview process is primarily one of clearing up questions, of seeking opinions about factors affecting market development, and examining the prospects for market expansion. This process

should lead to reasonable conclusions about rates of market expansion.

Throughout the ground study, the researcher should particularly look for actionable factors affecting the rate of market expansion. These are the "if's"—the things about which one can say "if this is changed, then . . ." The most important results of market potential studies stem from the identification of things that can be changed and, if changed, will affect export potential. Such factors come to the surface quite readily if a good rapport is established with the people contacted. Nearly everyone has an axe to grind, and the problem becomes more one of sorting than of finding.

### **Summarize and Conclude**

The final step is to report results. Conclusions should be reached and stated almost without regard to how tentative and uncertain they may be, or how lacking in sophistication the analysis may be. The chances of developing a high level of certainty or analytical thoroughness are not great. Data about markets and analytical studies of factors affecting market potential are very incomplete in most of the world. It should be kept in mind that a high proportion

of commercial decisions are made on quite skimpy evidence.

### **A Final Comment**

My experiences in several studies abroad lead me to make three final suggestions:

(1) The assistance of a national competent in both English and the language of the country involved is an invaluable asset and more than worth the extra cost.

(2) The researcher should proceed at a pace which allows him adequate time to think. We all get more or less obsessed with efficient use of time. There is danger of carrying the full-use-of-time notion to the point where there is only little absorption of the implications of what one has heard and seen.

(3) Keep an open mind. Things work differently in different places, and that which appears unreasonable by U.S. standards may be quite reasonable when put in the context of the subject country. We all take our own notions about economic organization, the role of government, cooperatives, and trade associations, and trade policy, income distribution, etc., with us. Some of these "stand up" and some do not when they are put in the context of a different country.



# Influence of Rural Institutions on Economic Development

DAVID E. LINDSTROM

Department of Agricultural Economics, University of Illinois

**M**Y ASSIGNMENT IN THIS CONFERENCE is to identify research tasks relating to the influence of rural institutions on economic development. To do so, one must first define "rural institutions" so that their influence on economic development may be assessed, positively or negatively. As for economic development, one may assume that this process encompasses all aspects that add to the accumulation of wealth, including investments in wealth-producing facilities and the exploitation of natural resources for the production of wealth. Such institutions include all of the social systems, from the family on the farm to the huge corporation, cooperative, or governmental system.

## The Meaning of "Institution"

The definition of the term institution is the same whether it applies to rural or urban society, although an institution may operate differently in different cultures. There is no unanimity in the way writers use the term institution. Williams<sup>1</sup> points out that an institution is sometimes defined not as a complex of norms, but as a concrete social organization (church, school, etc.) or as a broad field of activity (making a living).

The popular notion of an institution is often concretized in buildings and what goes on in them. Williams points out, however, that for the individual, institutional norms are moral imperatives, closely identified with his self-respect, and for a whole group or a society, violation of institutional norms carries severe penalties. These norms, however, must

be supported by an effective consensus of society. They are relatively stable and tend to prescribe reciprocal rights and duties and to be enforced through designated social functionaries. "Cultural norms," states Williams, "are institutional insofar as they are made obligatory by effective social agreement." Thus, the family, political institutions, education, economic institutions, etc., function on the basis of norms or modes that regulate recurring situations. Institutional norms are "internalized in individual personalities, inculcated and strongly enforced early in life, and they are objects of consistent and prevalent authority."

Implicit in the concept of institution, as used by Williams, is that of culture and of social organization. Culture, which relates to knowledges, skills, artifacts, symbols, technologies, beliefs, and values, as well as norms for conduct, contains the normative standards for behavior. Social organization refers to the actual regularity of human interaction, in which actions of individuals toward other individuals are recurrent and coordinated by the orientation of the acts of each to those of others. In this concept of organization, individual behavior in association is predictable because there are observable recurrent patterns of social relationships. They are most apparent in institutions having cultural norms that carry the elements of "moral imperatives," penalties for violations, and the imposition of penalties by an effective consensus of the society.

The institutional complex of any society is such that in this paper we can deal with only the most universal and

<sup>1</sup> Robin M. Williams, *American Society*. Alfred A. Knopf, New York. p. 30. 1960.

representative institutional forms in rural life. We must recognize that a great deal of research has been done on rural institutions, but much of it has been based on what might be called surface observations, such as the change in the composition of farm families, the relation of size of school to the most desirable size of school district or the most efficient type of school unit, and the relative influence of various forms of communication media on the adoption of farm practices. There is no implication here that such studies have not been valuable. But many have been limited by lack of empirical hypotheses which would enable the researcher to make more valid conclusions.

Improved research tools in sociology have become available, and more and better ones are becoming available, so that we can probe a bit further beneath the surface of social situations, make more accurate measures, and draw more valid conclusions concerning the nature of the phenomena and their influence on a changing society.

### Some Areas of Concern in "Developed" Societies

The rapid changes taking place in agriculture and rural life in the United States have challenged social scientists to assess causes for these changes, and to make the kinds of findings that will help guide both the economic and the total institutional development of our rural society. We might briefly mention some of the areas of concern as a frame of reference for identifying concrete research areas that relate to the influence of rural institutions on economic development.

1. Considering the image of the declining importance of agriculture, whether correct or not, Larson raises questions concerning (a) the wisdom and

difficulty of maintaining separate institutions for agriculture, (b) the role of the individual entrepreneur in the trend toward more advanced technology, (c) the effect on agricultural peoples of a decreasing concern with things agricultural, and (d) the influence of a growing rural-nonfarm segment on the family, the church, and other institutional forms in the community.<sup>2</sup> The information we have is all too meager—for example, information about the characteristics of individuals and families who are not mobile and yet are not making as satisfactory an adjustment to change, at least from an economic point of view, as would seem desirable. More probing research is needed to find out what new institutions of guidance, education, and control are needed to provide for rational and desirable change and to avoid or overcome maladjustments.

2. Heady and Ackerman assert that "today's challenge in educational activities is to facilitate adjustments in agriculture that are consistent with national economic growth."<sup>3</sup> It is important to learn more about the role education plays in economic growth. Chaparro and Allee point out that for some people *education is a conservative force*, its main function being to transmit and consolidate basic values and cultural traditions. It has a prestige value and is limited, in some societies, to socially selected minorities, and often the functions of education in economic and social development are overlooked.<sup>4</sup>

<sup>2</sup> Olaf F. Larson, *The Role of Rural Sociology in a Changing Society*. Jour. Rural Soc. 24(1):6.

<sup>3</sup> Earl O. Heady and Joseph Ackerman, *Farm Adjustment Problems and Their Importance to Sociologists*. Jour. Rural Soc. 24(4):325.

<sup>4</sup> Alvaro Chaparro and Ralph H. Allee, *Higher Education and Social Change in Latin America*. Jour. Rural Soc. 25(1):11.



3. Any changes in educational institutions must deal with the *structural aspects of these institutions*, for structure is one element that provides for stability, permanence, and resistance to change. Parsons asserts that the stability of the structure of the social system is a matter of the stability of the normative culture patterns of the institutions: the stability of the educational institution is related to its structure as well as to the value system that it supports.<sup>5</sup> Hence, if its structure operates to maintain the status quo, the institution is a deterring influence on economic development. An important area for study, therefore, concerns the nature of the structures supporting the educational institution and the influence it has on economic development.

4. It is apparent that studies of the influence of rural institutions on economic development must concern themselves with *social change*, since development is change. Wilkening points out in this connection that *institutionalized change*, present in advanced societies, is a long process. The concept, for example, of "new practices" is not a part of the thinking of the average Brazilian farmer. In general, it is not in the thinking of farmers of any society "characterized by self-sufficiency, a family-centered social structure, and limited participation in the world outside the village or locality."<sup>6</sup> In such societies farm and family are inseparable, and production and consumption activities are closely integrated.

5. Economic development in agriculture is of growing concern throughout the world. Mosher raises some pertinent points when he states that "agricultural

development has both social and economic aspects," that "economic development involves the breaking of old social patterns as well as the emergence of new ones," and that "the only prime mover in development is the *psychological drive within persons*."<sup>7</sup> This drive is socially and culturally conditioned. Mosher recognizes this fact—the influence of social values, sanctions, group action, and, within this framework, the effect of such social patterns as status, prestige, and social approval (or conformity) on agricultural development.

We know that the influence of rural institutions may be either to retard or to enhance economic development. It is often inferred that rural social institutions tend to deter rather than to enhance economic development. But rural institutions are constantly changing, and therefore the problem is whether the influence of changing rural institutions on economic development is to deter or to enhance. The task of the social scientist, then, is to determine the nature of changes in rural social institutions and their influence on economic development.

6. In this respect, diffusion research that digs deeply into institutional structures and processes is needed. An important element in diffusion is innovativeness (which, according to Rogers, can be conceptualized empirically and used to predict human behavior).<sup>8</sup> Innovativeness relates to personal characteristics that are influenced by family, educational, political, religious, and other rural institutions. In the diffusion process, an innovation may be looked upon as that force which introduces an invention into a society or culture. A basic problem of diffusion research is to

<sup>5</sup> Talcott Parsons, Some Considerations on the Theory of Social Change. Jour. Rural Soc. 26(3):223-224.

<sup>6</sup> E. A. Wilkening, Some Perspectives on Change in Rural Societies. Jour. Rural Soc. 29(1):3.

<sup>7</sup> A. T. Mosher, The Sociologist in Agricultural Development. Jour. Rural Soc. 29(1):20.

<sup>8</sup> Everett M. Rogers, Diffusion of Innovations. The Free Press of Glencoe, New York. pp. 283-291. 1962.

determine the role of the various institutional structures in this innovation process—why there is innovation in some and not in others, how innovation is produced, and what influence it has on the culture of which it is a part. According to Mosher, there is a great need for more research of this nature, stressing the role of the *person*.

### Some Specific Areas in Which Research Is Needed

■ An important and much neglected area of research by rural sociologists is *the family institution*—how families are changing and what forces are bringing about these changes. Such studies are important because, as has been stated, changes in the family institution affect economic development. For example, the Japanese farm household (the so-called feudal type) has been affected by such changes as the land reform, the outlawing of primogeniture, the attraction of city life to the “first-born” son, and others.<sup>9</sup> These forces have brought into being a more democratic owner-operator type of farm family that is taking a keen interest in scientific advances in agriculture, and this change has had a significant influence on economic development in Japan.

In the United States, not only is the farm family growing smaller, but there are significant changes in the patterns of authority, in family goals, family cooperativeness, relationships, attitudes, beliefs, and values, all of which influence the role of various types of farm families in economic development.

Family farming is still important, and the type of family on the family farm has a direct bearing on what happens in the production of food. Hence, more needs to be known about the changing

social and cultural character of families on various types of farms. Can it be shown, for example, that the modern farm family, which is becoming indistinguishable from the city family in its attitudes, values, manner of living, and goals, will no longer consider production as a family function? Will this trend, in turn, hasten the day when farming becomes entirely a matter of business, devoid of any element of a way of life? Will this change make the new type of farming more efficient and more productive, from the standpoint of both the entrepreneur and society? Research may indicate that there is a point of diminishing returns in this process.

■ Changes in the family institution are related also to changes in the systems of *landholding and transfer*. Since inheritance is one of the chief ways in which youths acquire ownership of farms in the United States, the kinship factor, instead of diminishing, is increasing in importance in the economic development in agriculture. Research is needed to fully assess the significance of this influence on the rate of diffusion of improved practices. Even tenant operation of a farm involves a heavy financial burden and quite often requires sacrifices in living standards that put the family at a disadvantage with even the small entrepreneur family in the small town. Although boys on tenant farms may want to leave the farm, studies have shown that rural youth in general prefer to live in small communities rather than in the cities.<sup>10</sup>

The trend toward owner-operation in this country would indicate that there are

<sup>10</sup> Lee A. Burchinal, *Career Choices of Rural Youth in a Changing Society*. Univ. Minn. Sta. Bul. 458. p. 13. 1962.

D. E. Lindstrom, *Rural Youth Resource Development*, Univ. Ill., Dept. Agr. Econ. mimeo. 1964.

W. H. Sewell, *Community of Residence and College Plans*. Amer. Soc. Rev. 29(1):29. 1964.

<sup>9</sup> K. Kamiya, *Farmers' Organizations and Community Development in Japan*. FAO mimeo, Rome, Ch. 1. 1963.



values in this type of operation. We may assume that this is true and that, with proper financing, the result would be greater economic efficiency and better living levels for the family. Thus, it might be worthwhile to determine whether establishing land values on the basis of appraised value would enhance owner-operation of family farms. (Incidentally, it might also be well to determine the effect of the proposal for government lending on this basis, with subsidies from the government to make up the difference between what the farmer pays and the market value. This is proposed as part of the President's program for alleviation of poverty.) Such studies should not stop with the effects on owner-operation, but should extend to farm family stability and the resultant influences on the support of educational, religious, and other institutions in the community.

■ The family performs important *educational functions*. One of these functions involves the occupational choices of young people. How these choices are made is important in economic development, for growing numbers of untrained workers will act adversely on economic growth. In western societies, the family has been the most important influence on occupational choice, and therefore it has had an influence on educational advancement of youth. In the older, underdeveloped societies, such as India, the structure of the society itself, the caste system, has determined the occupation.

The problem of occupational choice is related, of course, to the nature of the educational institution of a particular society. In the American school system, for example, there is a tendency, especially in the high school, to "educate" for college as a primary goal. Formal education for those who cannot or who do not choose to go on to college is largely

neglected. In our highly developed technological society, in which changes are taking place rapidly, research into the capabilities, interests, potentialities, hopes, aspirations, and desires of youth, especially rural youth, is very important.<sup>11</sup> Education in terms of individual needs and potentialities is still far from perfect.<sup>12</sup> Failing to help youth get the type of training needed for our expanding technology will retard economic development, and developing an effective system of guidance, based on research, will certainly have a positive influence on the economy. "Thousands of skills, beliefs, knowledges, values, and norms must be taught if culture is to have continuity."<sup>13</sup>

■ Research has been inadequate in regard to *institutions of social control*, not the least of which are political power systems, as they affect or influence economic development. In a democracy, the power to make decisions in the political system is supposed to rest in the hands of the people through their elected representatives. Major systems of social control, which seem to be moving in the direction of governmental support, tend to minimize the importance of the opinion of the individual. There seems to be a trend toward limiting decision-making to administrators and paid executives in huge bureaucratic systems—farmers' organizations, business corporations, economic cooperatives, and government and political organizations.

Little is known about the attitudes and desires of the rank and file of farmers toward existing and proposed farm programs. We know very little about how decisions are made and policies are formed in social systems of which farm-

<sup>11</sup> Lee A. Burchinal, *op. cit.*, p. 27.

<sup>12</sup> A. R. Mangus and John R. Seeley, *Mental Needs in Rural and Semi-Rural Areas in Ohio*. AES, Univ. Ohio. p. 18. 1950.

<sup>13</sup> Robin M. Williams, *op. cit.*

ers are a part. It is a question of how effectively farmers' wishes and desires are considered by farm organizations and are used in making policy decisions, and how well the channels are kept open, whether to the farmer or to the local community group, in forming, supporting, and changing these social institutions that serve the individual farmer. Instituting a research program, carried out by an unbiased research staff that would merely "poll" the opinions of farmers would be a beginning. To be most useful, such a research program must find out how farmers are supplied with information that will help them take an intelligent part in policy formation, and how they are using such information.

■ *Social welfare institutions* have grown in service and in cost. Many of them are set up to rehabilitate those who become recipients of public aid, the theory being that by placing emphasis on rehabilitation these agencies will work themselves out of a job. If this theory were to work out in practice it would have a positive effect on economic development, but the trend seems to be in the opposite direction. In two counties in Illinois, for example, persons making up one-fifth of the total population are receiving public assistance. Research is needed in rural areas to determine why people go on relief, what percentage are indigent—especially those needing permanent public support—and why the programs for rehabilitation are not successful. Such research should also reveal what influences social welfare institutions have on economic development.

The studies should be directed not only to institutions that help those who need public assistance, but also to FHA and similar programs. Case history data are readily available. Supplemented by carefully selected samples of the clients, such

studies could reveal the social and economic forces that cause people to go on relief.

Since people without adequate schooling make up a disproportionate number of those on the relief rolls, the results of such research might well point to the need for an intensified educational program and a better guidance program in the community—one that would find out the potentialities and educational needs not only of potential school dropouts, but of the unemployed, with a view to teaching new skills to fit them for jobs requiring special skills in our rapidly developing technological society.

■ Research studies are needed on the problem of the *underemployed in agriculture*. It has been said that many of the farmers on small farms would be better off in some other occupation. Only well-designed research can prove whether this hypothesis is true. It could prove, for example, that with the proper guidance some of these farmers could learn new farm practice techniques that would enable them to earn a better living than if they moved to a city, where job competition is already keen for unskilled labor.

### **Areas of Concern in "Developing" Societies**

The influences of rural institutions in a traditional society are different than in a modern or technological society. If the concern is for needed research in the traditional society, then one must take into account the stage of development—the extent that technologies have permeated the developing society—and the research design must be adapted accordingly.

In a society, for example, in which the traditional family and village system is still feudal and in which higher values are placed on religious, ceremonial, or traditional practices than on science, the



approach must be largely in the applied rather than in the pure research field. It must be concerned with closely integrated cultural norms, especially in areas in which the farming peoples are still controlled by what may be called preservative rather than the acquisitive norms.

**The nature of institutions in traditional societies.** Most traditional societies, which still mark the agricultural situation in the underdeveloped or developing areas, are those in which informal and institutionalized social relations dominate. These relationships, as in India, are highly stratified, as into the caste system. Hence, any efforts to bring about economic development, such as through the introduction of new or scientific forms or other practices, must inevitably run up against these stratified relationships.

An outstanding characteristic of the informal yet highly institutionalized relationship in agricultural societies of the developing countries is that of conformity to norms of conduct. These norms in themselves resist change to the type of society in which improved practices can take place.

**Importance of research on leader-group patterns.** Before much can be done by any change agent in bringing about economic change, research is needed to determine the institutional arrangements which tend to maintain the status quo. Such studies should reveal not only the leader-follower relations among the informal groups in the particular society to be studied, but also the systems of obligations and the internal power structure that has been developed to maintain this situation. Moreover, the mores and sanctions supporting those holding positions of power must be unearthed.

The results of this kind of a study will, in all probability, reveal existing situa-

tions of unrest and dissatisfaction, upon which programs of change may be initiated. The analysis of the group leader-follower patterns, the systems of dominance and submission, and the mores and sanctions give change-agents the basic data on which to develop plans for bringing about change in the agricultural area.

If the philosophy of the change-agent system is such as to use education and persuasion in bringing about change, the problem of actually initiating change is complicated by the necessity to change attitudes, values, and basic objectives of the institutionalized control or power elements in the target system. This then calls for research in attitudes, values, and objectives as well as the extent to which those holding positions of power may be favorably inclined toward any change at all in the system. Lacking such evidence of amenability, it may be necessary to wait until some sort of reform movement takes place in the country which weakens or displaces this power element—for example the landlord, religious-leader, money-lender complex of power—so that education for change can take place.

**Needed research on social systems.** It is not enough, therefore, to study the social-cultural situation in the target system; research must be carried on in regard to the nature of the change-agent system, such as the institutionalized system of adult education developed in a particular culture. This system, which ostensibly may be called a pure democratically oriented adult education system, may in fact be more nearly a pure bureaucratic system, highly influenced by the political system of which it is a part.

A study of how adult education operates, therefore, is quite important, if not essential, as a basis for determining how effective such a system is in actually reaching and teaching farmers new practices. It is conceivable that only those

(landowners) who already hold the balance of power, or absolute power, in the change-agent system are the chief recipients of the "teachings" coming out of the system. Hence, "systemic analysis" of the change-agent system is of basic importance.

**Needed research in social processes.** By the time that the "basic" research is completed or well underway the groundwork may have been laid for research in the diffusion process as it has been carried out in the United States, to determine what forces lead a farmer to accept or reject an improved practice. The reliability of such a study will depend, of course, on the readiness of farmers for such a program, or the extent to which the cultivator is actually the decision maker. Also involved in whether or not reliable answers are given is the basic ideology, or, one might say, the courtesy patterns among the owner and cultivator groups.

**Importance of social experimentation.** It may very well be that a study of the diffusion process, or the process of decision-making, should be preceded by a program of experimentation with adult education methods, including the use of demonstrations. Involved in this approach would be carefully planned local leader-teacher training and the use of participant observers. These observers would remain with the project long enough to secure a body of reliable observation on all stages of the process, from securing willingness on the part of group-selected demonstrators, to the evaluation. The evaluation should not only be concerned with results of one demonstration, but also the nature of the continuous use or adaptation of the practice by the adopters.

**Integration of research, teaching, and extension.** Implicit in the effort to develop a system of adult education attuned

to the peculiar culture in which the system is to work is that there is an integrated system which ties together research, teaching, and extension or adult education. The nature of this system of integration and how it works is an important subject for study in itself. For if adult education, and possibly research, is a state function, and teaching is an institutional function, such as through a privately operated college of agriculture, there is quite possibly a serious gap in the institutional structure which retards economic development.

**The process of involvement.** Closely related to studies already mentioned is the need for study of the system of involving farmers (cultivators) in the total decision-making process. This can begin at the family institutional level, to learn how farm and family decisions are made and how they are influenced by social forces, both on the target system and change-agent system levels.

Such research can take account, also, of the way in which local governmental systems operate to enhance or to deter decision-making and social action, for example, in the formation of mutual-aid or cooperative efforts of various kinds. This is a vast area for research in developing countries, because the way in which cooperative and organization efforts are regarded, implemented, and controlled is frequently quite different than in developed countries. In many countries, farmers' organizations include all systems set up to benefit farmers. Many potential (and actual) social systems involving farmers are those relating to land and water use.

Studies are needed, not only to determine the ways in which farmers (cultivators) in the developing countries can be involved in programs for some farm size rationalization, but also to define the evolving systems in such recently devel-



oped countries as Japan. This is a problem not only of land reform, but of maintaining or building up adequate social and economic units of operation.

**Needed research relating to community development.** Both institutional change and economic development are being affected by a movement called community development in the developing countries. This concept, as it has developed in East Asia, looks to a "gestalt" type of development in which economic improvement is supposed to go along with health, educational, and communicational improvement. With the low institutional levels of great masses of the population in the developing countries, a study of such a movement deserves support. It can be hypothesized that before significant economic development can take place the institutions of health, education, and communication must be improved.

The important element in such a study is, again, how the people, through their local leaders, can become involved. And this, in turn, depends on an understanding of the value systems of the people and their attitudes toward better health practices, the nature and content of the educational program, and the spirit and philosophy of that program.

**Needed interdisciplinary cooperation.** It is apparent from the above that research regarding the influence of rural institutions on economic development in the developing countries is not a one-man, one-discipline, or one-institution job.

Models of social research can be developed by rural sociologists along the lines suggested above, and results can be very useful in aiding programs both for economic development (the means) and social and human welfare (the ends). Too often we have put the cart before the horse—that is, by starting farm planning, for example, before an agricultural society is ready for it. The neglect of

sociological studies related to the problem of making technological advances has frequently not only retarded the process of acceptance, but has also distorted and caused serious maladjustments in the society for which change should be beneficial. It is well known that invention and innovation require a social situation in which both can take place.

The situation facing the developing countries is serious enough that cooperative or team effort on the part of natural and social scientists should be an imperative.

### **Concluding Comments**

The problem of identifying research tasks relating to the influence of rural institutions on economic development is as broad and complex as the institutional structure of rural society itself. In this paper I have attempted to define the problem by defining institutions, to mention some areas of needed research expressed by other writers, and to discuss briefly some of the areas in which research is needed. It has been emphasized that economic development influences as well as is influenced by changes in rural institutions. The whole economic order, from a sociological point of view, is a network of norms and expectations—a web of "promises" as to the course that economic action will take, or is supposed to take. Institutional barriers can limit the encroachment of economic pressures. The kind and extent of economic rationality depends on complex relationships in the total social or institutional structure.

These and other interdependent conditioning factors make imperative the further study of the influences of rural social institutions on economic development. The development of research programs in this area should therefore involve both economists and sociologists, and contributions could also be made by anthropologists and social psychologists.



# Land Ownership and Tenure Reforms

FOLKE DOVRING

Department of Agricultural Economics, University of Illinois

IT IS NECESSARY TO POINT OUT, from the outset, that the socio-economic role of landownership and of the various forms of tenure is always specific to a given society, at a given time or over a given period of development. Experience from one country is not necessarily in any manner applicable to another one, either now or within such time in the future as one may reasonably plan for.

The reason is not only in the striking differences between the socio-economic and cultural conditions of different countries. More than that, we want to emphasize the time factor in socio-economic development. It is not enough to assume that all countries are traveling along essentially the same path of development and will eventually arrive at similar results. Such a statement will have to be proved before it is accepted. But even though such an assumption is made, it remains true that existing differences in development represent time lags which will take considerable time to overcome. When someone is planning an institutional reform to serve development efforts better in the immediate future, it is not necessarily of any interest to him that the institutions he plans for will become obsolete in a remote future. So will also the institutions being planned or reformed in developed countries; yet the present and the near future must be given the institutions that will be of most service in their time and place.

As an opening statement we therefore submit that the recent experience of highly developed countries, where it may appear that the ownership and tenure ideals of the past are becoming obsolete, does not immediately apply to underde-

veloped countries. It would do so only if it could be demonstrated or made likely that these latter countries would soon reach a level of socio-economic development similar to that on which the advanced countries are now experiencing these problems of institutional obsolescence, if such they may be termed.

As a further consequence, we submit that any evaluation of existing institutions, and any plan for institutional reform, must be oriented in the time dimension. What is the present level of economic development? How soon may some other level be reached with the expected rate of population growth and existing conditions for economic progress?

The theory of differential sector growth is highly relevant here. Experience and logic concur in showing that when the agricultural sector employs a large majority of a population it cannot display any very rapid rate of economic growth. Even though the other sectors were expanding at high rates, considerable time would elapse before they were a large enough part of the whole system to dominate the picture and render possible a very rapid overall growth. Above all, in these early phases of development, the prospect of a reduction in the absolute numbers of people engaged in or living from agriculture is usually remote. The possibility of reducing the absolute size of the agricultural population, with the attendant possibilities (and problems) of adjustment, usually comes up in an advanced phase of development and the reduction can continue as the country becomes more highly industrialized.

With these general remarks in mind, we will discuss some of the current pros



and cons about land reform, and the research necessary to settle some of these controversies.

### **Distributive Equity vs. Productivity**

The argument in favor of breaking up large operational holdings, and creating small ones, usually turns around a supposed dichotomy of social justice *versus* economic efficiency. Several elements in this line of argument must be kept apart and discussed separately.

**The productivity issue — “returns to scale.”** The most common argument in favor of maintaining (or even creating) large operational holdings refers to scale advantages. Sometimes a curious resemblance comes to light between the reasoning of “agrarian industrialists” in the western world and those in communist countries. When “returns to scale” are not blankly assumed to obtain *a priori*, they are often brought out as a finding from analyses of bookkeeping results from individual farms.

A critical point for research in this area is the discrepancy between individual and social accounting. Operators of large estates have to economize with inputs in order to achieve the best possible rate of output to input. Hired labor always has a price, and paying for more of it, in cash or kind, increases the financial risk of the farm. Economizing with labor reduces the risk, and substitution of capital for labor may often raise the rate of return to the farm, even in underdeveloped countries.

If the labor which is replaced finds no other employment, then the substitution has not increased the rate of return in social accounting. On the contrary, it may have lowered it. To the extent that this is true, the productivity argument in favor of large farms is valid only in the private accounts of the operators of such

farms. In social accounting, for the economy of the country, intensive use of surplus farm labor may make more sense.

The research task here is to find out the real merits or demerits of peasant farms and large-scale operation. The above-indicated frame of theory may yield an answer in one direction or the other, depending upon what magnitudes are involved. For instance, it may be found that peasant farms measure up well in comparison with the alternative of establishing new, large, centrally operated estates that would entail heavy investment; at the same time, “plantations” actually in existence as going concerns may be found to represent the best use of the resources already invested in them (as “sunk costs”).

As a sideline, there should also be an investigation of the extent to which “returns to scale” on large farms result from applying a very low wage scale to hired labor. The test here, which again might go one way or the other, would be in a comparison of the incomes (per year, not per hour) of wage laborers and of independent small farmers.

**Aggregate yield measurement.** In an underdeveloped country, inputs in agriculture usually consist almost entirely of land, labor, and farm-produced factors such as draft animals, hand tools, etc. Externally generated factors are of small importance in absolute quantity and are often concentrated on certain specialty crops (often intended for export), which are not necessarily in the center of attention in debate about land reform. In many situations, it is therefore of interest simply to measure gross output per unit of land area, as an expression coming close to net resource productivity, on the usual assumption that local farm labor is surplus to such extent that its opportunity cost can be treated as zero.

In this type of measurement, it is necessary to distinguish aggregate yield (price-weighted aggregates) from the physical yield of individual crops. High acre yields of individual crops are not necessarily a symptom of high technical standards of farming. They may result from extensive cropping practices, where crops with high fertility requirements are kept to a minimum and much good land is planted to crops which, in a more intensive system, would occupy only lower grade land. Conversely, intensification of the cropping pattern may well lead to a lowering of the acre-yield of individual crops, at the same time as the aggregate (price-weighted) outturn of all products per area unit goes up.

The result of such an analysis is seldom clearly evident of itself, except in areas where soil and climate are homogeneous to a high degree. In most cases it will be necessary to investigate the variations in soil fertility, climate, and water supply to insure that the areas on which yields are measured are comparable on the different farm sizes.

Empirically, densely settled areas of peasant farming often do produce larger quantities of farm products per unit (unweighted or unclassified) of physical area than the larger farms. The research task here is to find out whether and to what extent this is so in the given case, and whether and to what extent the same finding holds when soil productivity is taken into account in the comparison.

**The livelihood issue.** One of the dilemmas of land reform in very densely settled countries is in the large number of people who are potential beneficiaries. If they are each to receive a holding, these holdings will be very small. The argument is often heard that such holdings are uneconomic. They would be unable to own, or even to use rationally, many of those modern means of produc-

tion which are conducive to higher levels of productivity.

The validity of such objections may be questioned. In the underdeveloped situation, many of the heavier types of equipment are unavailable in any appreciable quantity, and cooperative use and mutual aid between neighbors might take care of other items not economical for individual ownership. But the question of how many people should be accommodated in agriculture remains valid and is a researchable problem of the first order when land reform is under debate.

As an extreme solution it is sometimes advocated that a reform of the farm size structure should aim at making farms as large as they need to be for optimum factor productivity, and that all the surplus labor should be employed elsewhere, such as on public works. If the reasoning in the above sections on returns to scale and aggregate yield measurement is applied to the actual level of factor supplies — and their potential levels are anticipated over the period of a plan perspective — then, of course, this “optimal” farm size may still be quite small. The problem then is: Will the accommodation of the entire agricultural population on individual holdings lead to a lower than optimum level of resource productivity in the aggregate — to a net loss for the national economy? The counterpart is, of course, that, if some of the present agricultural families are left without any holdings, they must be given another source of livelihood; when all or most of the land is in family-size holdings, there would no longer be any use for hired workers.

Creating sources of livelihood for the landless will not be without cost to the community. If their number is very large, the task may not be at all feasible in an underdeveloped country. Most important, many of the activities or arrange-



ments adopted to accommodate the landless would almost certainly be such that they would cause a deficit in the national economy. The center of the problem is then this: Which would be greater — the deficit mentioned in the preceding sentence, or the loss of productivity because the land reform was made to accommodate nearly all the agricultural population? The answer may well depend on the size of administrative overhead needed to handle the two alternatives.

Of course there should also be an investigation of what the effect would be if the reform were done only halfway, leaving enough of the larger farms in existence to continue to employ the landless for wages. It is possible, for instance, that an analysis of recent agricultural progress in Mexico would show that the remaining large farms received enough of an incentive, from the fear of continued land reform, to make them try to justify their existence through rising productivity. This line of reasoning has been consistently applied in Spain. Expropriation and subdivision has been used as a way of eliminating low-productive estates and creating more productive peasant farming areas, but also as an admonition to remaining estate owners to improve their landholdings or face the consequences. The application in Spain has been piecemeal and incomplete, but it appears to have had some of the desired effect.

**The role of distributive equity.** Distributive equity is usually regarded as one of the social goals of land reform. Unlike the leveling of money incomes in an urban economy, distributive equity in a peasant society is seldom credited with giving stimuli to the economy in general. Peasants living in partial self-sufficiency are not fully integrated into a market mechanism and might contribute less, not more, to an exchange economy.

The question is whether this way of contrasting the social merits of distributive equity against alleged economic drawbacks is justified. How far the small-scale operations of peasants become integrated into a market economy depends on other things, such as taxation, rent paying, the use of credit, and economic policy in general. There is no particular reason why landless farm workers would be better customers for nonfarm products than the farmers with small holdings.

A common objection against an economy with small farms is the allegation that the peasants tend to consume most of what they produce themselves, and bring only insufficient supplies to the market.

The tendency to market a larger or smaller part of the output is certainly a key problem to explore. In one sense it is logical to assume that a lesser share is marketed when the independent producers constitute a larger part of all the consumers; in a large-farm-and-wage-worker economy, some part of the output may be exchanged on the local market and bought by farmhands for their cash wages. Such a market exchange is of dubious benefit, as is also the case (known, i.a. from India) of farmers providing themselves with disguised credit by selling for cash in one season the food they will buy back in the next for more cash. That farmers retain more food for their own consumption may also lead to better nutrition and health among themselves, which is a contribution to national welfare and productivity.

The core of the problem is not really in the *proportion* of farm output that is marketed, but in the *absolute quantity*. An inquiry into bookkeeping results in Hungary in the 1930's, revealed precisely this: The larger farms marketed a higher percentage of their output than the



smaller ones, but the latter produced so much more output (aggregate, price-weighted) per unit of area that their lower percentage of market deliveries amounted to larger absolute quantities, per acre in farms, than were marketed by the larger farms. The criterion of land productivity is, of course, subject to the tests suggested under the above section dealing with aggregate yield measurement. Another approach to this general problem would be to compare the trend in market deliveries from areas of different farm-size systems. The extent to which each area supports a growing population, and the welfare conditions of that population, are, of course, other tests, in addition to the level and trend in market deliveries.

### **Tenure Conditions and Their Effects**

Changes in tenure conditions, in many cases, have a larger impact than subdivision of large holdings. In most underdeveloped countries of the present and the recent past, most of the large estates are or have been cultivated in small tenant holdings, to a great extent by sharecroppers. Current statistics are sometimes deceptive on this point. For instance, the farm censuses in Brazil (1940, 1950) and Iraq (1953) represent as large, owner-operated holdings what are, in fact, complexes of cropper holdings.

Also, in the recent past, tenure reforms have had more impact than farm-size reforms. Protection of tenant farmers in Italy and Spain has touched larger segments of the farm industry than did the establishment of new small farms. The land reform in Egypt redistributed one-tenth of the land but protected the position of tenant farmers occupying one-third of the farmland of the country. In Japan, the postwar land reform was principally a shift from tenant farming to owner farming, with very little change in

the size structure of farms. Also in India, recent and current reform measures have touched upon conditions of tenure more than they have affected the size of operational units.

Research tasks in this area include the economic effects of the tenure forms as they exist and the possible effects of a specified change. The formulation of a problem in this area is complicated by the degree to which the solution reflects socio-psychological instincts and attitudes and the possibility of changes in these patterns.

The doctrine of the superiority of *ownership by the cultivators* was handed down to us from the socio-economic reform movements of the 18th century. In many instances, it has come to be identified as the ultimate goal of a land reform, whether by changing farm size or tenure or both. As such, it has brought the land reform idea under fire by two rather distinct lines of argument.

One argument points to recent experience in the highly industrialized countries when agriculture has become increasingly capital-intensive. The ideal of ownership may no longer be rational. This argument can be disposed of rather quickly in most underdeveloped countries by reference to the time dimension. If the day is remote when the country's agriculture may become highly capital-intensive, then the argument is not valid for practical planning.

More important are the objections arising out of conditions in the underdeveloped countries themselves. In the extreme case it is pointed out that many people, for example, in Africa, are not property-minded enough for the typical ownership incentive to work satisfactorily. The 18th-century economists wrote on the basis of European experience, in a society where the individual family rather than the tribe or village community was



the identifiable nucleus of economic activity and economic obligations. In a different socio-psychological setting, institutional arrangements might have to be different.

The risk is in jumping from one generalization to another one. The fact that traditional peasant societies in Africa or Asia are different from those of 18th or early 19th century Europe does not mean that they are different altogether or that they will prove immune to the evolutionary tendencies which force economic responsibility upon individuals.

Apart from study of the peculiar structure of land law and the social function or property as they exist, it is equally essential to note any ongoing changes and to interpret the possibilities they open up for an institutional setting which may unfetter individual response to incentive without clashing too destructively with the prevalent instincts and habits of the people concerned. The *paysannat* in the Congo is (or at least was) an interesting experiment, and its parallels on the spontaneous level (such as individualizing of cocoa groves in West Africa) ought to be studied attentively before any judgment is passed either for or against ownership by cultivators as a social form for agricultural development.

In large parts of the underdeveloped world, individual ownership is at any rate a conscious goal capable of attracting massive popular support. It is interesting to note how the tradition-inspired institution of the *ejido* in Mexico has generated little practical collectivism. Legally the land is held in common by the village, but in most cases cultivation is individual, usually under stable tenure of the same land parcels.

In some cases, it is also suggested that owner-farmers in underdeveloped countries are actually less productive than tenant farmers or even sharecroppers.

For instance, it was stated recently that owner-operating peasant farmers in the Philippines had lower crop yields than share croppers. To be valid, this argument would have to show that the two categories had essentially the same qualities of land and applied essentially the same level of intensity in their cropping patterns. Experience from Europe and elsewhere indicates that landlord ownership became established and maintained principally in the most fertile areas, while peasant ownership could more easily maintain itself on marginal land. As regards sharecroppers, it is of course also possible that the cropping plans laid down by landlords imply a less intensive pattern of land use, and thus higher yields of individual crops but not necessarily higher aggregate yields (in the same way as discussed above for farm-size differences). It is the productivity of comparable resources that should be established before judgment can be passed.

The wider question of incentives and how to overcome the limiting effects of a "target demand" is one that transcends the discussion of tenure forms. Some aspects of it will be discussed later in connection with agriculture's contribution to economic growth.

The economic pros and cons of alternative terms of renting must be judged in similar terms when the country is short of capital and needs vigorous expansion in production at minimum investment cost. The production results under alternative tenure forms must be assessed on the basis of social rather than private accounting.

The drawback of sharecropping may thus not be confined solely to the lack of incentive for the cultivators to raise unit yields. As long as it is done exclusively by means of investing more manual labor, it can have a certain attraction also for cultivators who get only their share of

the added output. The element of risk-minimizing seems at any rate to be the reason why not only landlords but also peasants, in situations of capital shortage, often prefer sharecropping to other rental arrangements.

There is a possibility of crop diversification as a means of raising aggregate output. Most inquiries show that sharecropping in underdeveloped countries tends to favor monoculture, with its obviously depressing effect on aggregate output and on welfare in a crowded country. It is characteristic that the classical cash rentals in England were associated with an obligation for tenants to apply certain diversified patterns of cropping. Similar arrangements were applied in recent land reform measures for intensive farming (for example, in Italy and Spain) and also, for instance, in the "paysannats" in the Congo. It seems unlikely that such schemes for intensive farming could be carried out under sharecropping contracts in the conditions of underdeveloped countries. Any evidence on this point should be analyzed to clarify the issue. The answer is not necessarily the same, or even analogous, in all countries.

### **Effects of Land Reform on Economic Growth**

The problem formulations set forth above centered around the productiveness of alternative tenure arrangements. Tacitly, it was assumed that the highest rate of return — in underdeveloped countries, in most cases, the highest rate of physical output — would be in the best interest of the country. In the following we will discuss some attendant problems concerning the effect on economic growth which may be expected from the change in volume of output that should come in the wake of a land reform.

It has been charged many times that

the increased distributive equity achieved by a land reform would blunt economic growth by allocating more of the output to direct consumption on farms and making less of it available as a basis for capital formation in other sectors of the economy. As a case in point we may refer to Turkey. The country had a radical land reform several decades ago. The peasants became full owners and from then on they not only paid no rent to landlords, but paid no taxes either. Their contribution to economic growth was limited to the quantities of farm products they had to sell to cover their modest cash needs. In a static economy, with a peasantry rather disinclined to achieve more of the good things an industrial economy can produce, the land reform led principally to an accelerated population increase, with little or no movement toward a diversified economy or rising levels of living.

In contrast, it is easy to point to contributions to economic growth made elsewhere by an agricultural sector with less-idealized institutions. Land rents and land taxes built up much of the industrial capital in Europe and Japan, and the U.S.S.R. financed its industrial buildup from a system of disguised land rent — the forced deliveries at fixed low prices. North America and Oceania needed none of this, but they were dynamic enough, on an unusually generous resource basis, to produce savings out of their agriculture merely through the price mechanism.

The extreme case does not, however, correspond to the conditions we are discussing here. The problem area is land reform *in* economic development, not outside of it. The assumption is that several types of dynamic change promoting economic growth are under way or planned. In such a situation, the contribution of agriculture could be provided in one of several alternative ways.



The frequent charge of increased consumption on farms is only in part an objection. In part it is one of the objectives of economic progress to improve the nutrition of the entire population, including the agricultural population. The argument could be valid only to the extent that it meant less sales available to supply the nonagricultural population or the export markets. Such cases may have existed, but it is questionable whether they were due to the land reform, as such, or would have occurred anyway as a consequence of population increase.

The capitalistic landlord no doubt fulfilled a useful function in the past of many countries when he collected rent or surplus output and used the proceeds for investment toward higher productivity, maybe in agriculture but more often, and more significantly, in other industries. The trouble with many landlords in underdeveloped countries is not that they charge rents, but rather that they use too much of the rents for luxury living, land buying, and hoarding, and too little for purposes that will promote economic growth. Even as regards the cotton plantations in the antebellum South, the charge has been made that they operated an essentially static system that was at best capable of expanding horizontally but did not generate progressive capital formation. The country benefited, of course, from the profits taken by commercial middlemen, but they did not necessarily reside in the cotton areas.

Eliminating parasitic landlords therefore does not shatter a productive institutional arrangement; it can be a definite improvement if combined with rising productivity and some suitable arrangement for siphoning off some part of agriculture's value product to capital formation. An interesting side effect can be noted in countries where the landlord class has been dispossessed (entirely or

in part) and compensated in cash. When rich people can no longer invest in land for effortless income, they have to make their money work elsewhere, and the propensity to invest in other industries should be enhanced. Mexico is probably a good case in point, possibly Egypt too (at least for a short period), and effects of this kind can also be seen in several other countries. More attention should be given to this aspect of mobilizing the potential energy of the wealthy classes.

The same procedure would naturally lead to sustained market sales of agricultural produce. When the beneficiaries of the land reform have to make periodic payments as installments on the value of their land, this guarantees that they will not roll back into low-productive self-sufficiency. Even where the peasantry was initially characterized by a low-level "target demand," the installment payments on the land would become part of the target and fulfill the same function as was previously fulfilled by rent payments. When the period of installment payments is over, these peasants should have become sufficiently money minded to continue effective market supply.

Apart from this, and beyond the time when all installments were paid in full, increased market deliveries could be secured either by taxation or price policy or both. How these devices have functioned in the past deserves to be further explored as an adjunct to research on land reform itself. Especially in situations of "target demand," a low price might lead to larger sales rather than the other way around. The role of "target demand" is complex, however, and must be explored in the case at hand before any policy is based on the assumed character of the demand function.

The other question of how a whole population reacts to a far-reaching social change is one that partly escapes conven-

tional analysis. The amount of energy that is released in a people when age-old class barriers are broken down cannot be computed by any known device. What we should be able to anticipate is whether this psychological reaction to an institutional reform will be strong or negligible, immediate or delayed. Study of the history of other peoples is not the main answer, since much depends on the specific experience of a given people, its frustrations in the recent past and its expectations for the future. Some land reforms have fallen flat because of lack of psychological preparation; others have had enormous impact on the life of a people — sometimes more as a general catalyst than through any specific and traceable economic effect.

No economist who contemplates institutional reform can therefore neglect the state of mind of the people concerned, or how it may be modified by propaganda or persuasive publicity. Conventional economic analysis usually takes the institutions for granted and then also overlooks their basis in public opinion and the factors that shape it. Even if the economist does not intend to advise on the

propaganda process, let alone engage in it himself, he cannot afford to neglect the realities of this process or the impact it must have on the viability of alternative solutions to the problem of reforming economic institutions.

Perhaps we should add a word about the state of mind of the ruling classes. In several underdeveloped countries, a traditional, rather narrow-minded class of wealthy landlords stands in the way of economic progress. These people can be forced to make reforms by the threat of revolution, or the revolution may come and sweep them aside. A much more creative approach would be to make them see the economic advantages to the country (including themselves) that could come from a more productive land system. "Reform from above" was a positive European experience in the age of enlightenment. To spread this kind of insight in the leading classes of a backward country is definitely one form of propaganda in which economists should engage. For this to have effect, the issues must be clearly thought out and analyzed and their application to the country in question should be made convincing.











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